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NANTICOKE

ENVIRONMENTAL MANAGEMENT PROGRAM

NETWORK DATA SUMMARY FOR 1983

REPORT No. ARB-168-84-ARSP

September 1984

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NANTICOKE
ENVIRONMENTAL
MANAGEMENT
PROGRAM

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NANTICOKE ENVIRONMENTAL MANAGEMENT PROGRAM

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SEPTEMBER 1984

Participants: Environment Canada • Ontario Ministry of the Environment • Ontario Hydro • Stelco Inc. • Texaco Canada Inc.

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1. INTRODUCTION:

The Nanticoke Environmental Management Program (NEMP) is a co-ordinated study into the impact of industrial development in the Nanticoke area on air quality in the Haldimand-Norfolk region. It is jointly sponsored by the Federal and Provincial governments, Ontario Hydro, Stelco and Texaco. The NEMP monitoring network, established in the fall of 1978, was operated throughout 1983 to measure adherence to air quality criteria (AQC) for the protection of human health and comfort as well as that of vegetation, animal life and property. In addition to the NEMP network, Ontario Hydro has been operating an SO_2 network of approximately 16 monitors since 1975 and MOE West-Central Region has been operating gaseous monitors at Cheapside and Simcoe as well as a hi-vol network consisting of 6 samplers.

A major industrial complex comprised of a thermal generating station, a steel plant and an oil refinery is situated on the northern shore of Lake Erie in the Haldimand-Norfolk region. Ontario Hydro, Stelco and Texaco operated throughout most of 1983. Table 1 outlines the major emission sources and their 1983 emission estimates for sulfur dioxide and particulate matter. Emissions from Ontario Hydro's generating station are released from two 198-metre stacks (separated by 275 m), whereas emissions from Stelco and Texaco emanate from stacks as well as low-level sources. Monitoring stations have been located according to criteria that take into account predominant wind patterns and source configuration, as well as in reponse to concerned citizens. The network configuration for 1983 remained the same as for 1982. Figure 1 shows the location of monitoring stations and Table 2 lists the parameters monitored at each location.

This report complements the fourth data summary report covering network data up to December 1982 (4) and summarizes the data collected by the NEMP network during 1983.

2.0 Gaseous Data Analysis

2.1 Analysis of Sulfur Dioxide (SO_2) Data:

Hourly averaged SO_2 concentrations were monitored at twenty locations during 1983. Sixteen stations were operated by Ontario Hydro, two by MOE's West Central Region and two by the NEMP network. Figure 2 shows the annual frequency distribution of hourly averaged SO_2 concentrations for 1983. Seasonal frequency distribution of the hourly SO_2 concentrations is shown in Figure 3. The ninety percentile level coincided with 18 ppb for the winter of 1983 compared with 9, 10 and 10 for the spring, summer and fall season respectively.

2.1.1 Hourly SO_2 Criterion:

The hourly AQC for SO_2 is 250 ppb. There were 8 hours during 1983 when the hourly AQC was exceeded. Details of those hours with exceedances are listed in Table 3 together with the concurrent generating station load. The Nanticoke T.G.S. was the source of the SO_2 exceedances since the monitors were located directly downwind of the station for each event. The maximum hourly averaged SO_2 concentration (438 ppb) was recorded at NNW08. Table 4 shows the number of network exceedances of the hourly AQC for the period 1975-1983.

2.1.2 Daily SO_2 Criterion:

The 24-hour AQC for SO_2 is 100 ppb. Once again, there were no exceedances of the daily AQC. The maximum 24-hour average (75 ppb) was recorded at E05 on December 24.

2.1.3 Annual SO_2 Criterion:

The annual averaged values at all stations during 1983 were well below the 20 ppb criterion. The highest annual average (6 ppb) was recorded at NNE05. Table 5 summarizes the SO_2 annual averaged concentrations, as well as other statistics of the observations for individual stations.

2.2 Analysis of Ozone (0_3) Data:

Figure 4 shows the annual frequency distribution of the hourly averaged ozone concentrations for SW37, NNE39 and WNW19. At monitors SW37, WNW19 and NNE39, the ninety percentile level coincided with 54, 54 and 44 ppb respectively (Table 6). The annual average ozone concentration was 30 ppb at SW37, 30 ppb at WNW19, and 24 ppb at NNE39.

Figure 5 shows the seasonal frequency distribution of the hourly averaged 0_3 concentrations. Seasonally, ozone levels are highest during the summer period and lowest during the winter. Warm temperatures and strong insolation (characteristic of southerly winds during the summer period) are conducive to ozone formation. The ninety percentile for the entire network concided with 75, 28, 42 and 45 ppb for the summer, winter, fall and spring seasons respectively.

2.2.1 Hourly 0_3 Criterion:

The hourly AQC for ozone is 80 ppb. During 1983, there were 393 hours when the 0_3 AQC was exceeded. This year, the monitor at Simcoe reported the maximum number of exceedances (182) compared with Long Point (169) and Binbrook only (42). The Long Point monitor experienced flow problems during part of June and therefore was inoperative on several days in which 0_3 exceedances occurred. Ozone exceedances occurred on forty days during 1983. Of the 40 days thirty-eight were during the growing season (June to September).

2.3 Analysis of Nitrogen Dioxide (NO_2) Data:

Nitric oxide (NO) concentrations were subtracted from total nitrogen oxide (NO_x) values to obtain hourly NO_2 concentrations. The nitrogen oxides network once again, contained five stations (SW37, NNE39, NO7, WNW19, and NNE10). Annual average concentrations were below 10 ppb, see Table 7. Figure 6 shows the annual frequency distribution of the hourly averaged NO_2 values. Ninety percent of the time, the NO_2 concentrations did not exceed 20 ppb.

2.3.1 Hourly NO_2 Criterion:

There were no exceedances of the one-hour (200 ppb) AQC during 1983. The maximum hourly NO_2 concentration (80 ppb) was recorded at WNW19, on October 16.

2.3.2 Daily NO_2 Criterion:

The daily AQC for NO_2 is 100 ppb. During 1983, there were no exceedances of the daily AQC.

2.4 Analysis of Total Reduced Sulfur (TRS) Data:

TRS was monitored at four locations, (NNE10, NNE05, NNW08 and WNW03 during 1983. Figure 7 shows the annual frequency distribution of the hourly averaged TRS concentrations. As in 1982, the highest hourly averaged TRS concentration (46 ppb) was recorded at the Nanticoke Village (WNW03) monitor, Table 8. On June 23 during the early morning hours, three monitors recorded elevated levels of TRS. WNW03 recorded 30 ppb at 0100; 90 ppb at 0200; 10 ppb at 0300; 10 ppb at 0500 and finally 18 ppb at 0600. Monitor NNE05 recorded 17 ppb at 0200 and 11 ppb at 0300 while NNE10 recorded 9 ppb at 0300. Surface winds were calm during this period. It is suspected here that the process of quenching (water spraying of the molten slag) at Stelco caused the elevated TRS readings. Relatively high hourly averaged TRS concentrations are listed with corresponding wind data in Table 9. Of the 19 incidents of elevated TRS, 13 were recorded at or near midnight on a Wednesday or Saturday. This corresponds to the time cycle used for quenching.

2.5 Analysis of Carbon Monoxide (CO) Data:

Monitoring of CO continued at NNE39 and SW37 throughout 1983. Figure 8 shows the annual frequency distribution of hourly averaged CO concentrations for 1983.

2.5.1 Hourly CO Criterion:

There were no exceedances of the hourly (30 ppm) AQC for CO during 1983. The maximum hourly averaged concentration (9 ppm) was recorded at NNE39, Table 10.

2.5.2 Eight-Hourly CO Criterion:

There were no exceedances of the eight-hour (13 ppm) AQC for CO throughout 1983.

2.6 Analysis of Hydrocarbons Methane (CH_4) and Non-Methane (NMHC):

Hydrocarbon monitoring continued at NNE10, NNE05 and NNW08 throughout 1983. Figures 9 and 10 show the annual network frequency distribution of CH_4 and NMHC. The annual average concentrations for CH_4 and NMHC are summarized in Table 11 and 12 respectively.

It should be noted that the electrical noise problem experienced in the latter part of 1982 continued on into 1983. The validity of the observed values once again remain in doubt.

3.0 Airborne Particulates Data:

The particulate monitoring network in the Nanticoke area during 1983 consisted of 14 hi-vol samplers, operated by NEMP (Figure 11). Glass fibre filters were used at all locations with parallel sampling on Whatman 41 cellulose filters at nine stations. TSP measurements were carried out on the glass fibre filters while a detailed chemical analysis was done on selected Whatman 41 filters. Some of the glass fibre filters were also analysed for inorganic (CF) and total carbon (CT). A six day sampling cycle was used at all stations except for the hi-vol samplers at W07, NW03 and NNW06, which operated on a three day cycle to monitor the Stelco emissions. Sampling periods were 24-hours in duration.

Suspended particulates are summarized by station in Table 13. As in previous years, the annual geometric means were in the 30-40 ug/m^3 range. The annual and seasonal frequency distributions of TSP for the entire network are shown in Figures 12 and 13. Figure 14 shows the monthly geometric mean for the NEMP network TSP data (1979-1983). The monthly trend in TSP levels has been similar for all five years data.

3.1 Daily TSP Criterion:

The daily AQC for TSP is 120 ug/m^3. During 1983 there were 6 exceedances of the criterion.

The two TSP exceedances recorded at montiors NW03 and NNW06 on June 14 are related to agricultural activity since the farmland adjacent to these monitor locations was being ploughed on this day.

Exceedances reported at NNW06 (134 ug/m^3) on June 17 and at NNE05 (137 ug/m^3) on June 23 coincide with regional episodes since above normal TSP levels were recorded throughout the Nanticoke region on these days.

It is possible that the remaining two exceedances are attributed to industrial emissions. On April 27 and July 14, the monitor at NW03 recorded daily TSP concentrations of 129 and 132 ug/m^3 respectively. Surface winds on these days were predominantly southwesterly at 10 to 20 km/hr. Details of the TSP exceedance events are listed in Table 14.

3.1.1 Annual TSP Criterion:

The annual AQC for TSP is 60 ug/m^3. Throughout 1983, there were no exceedances of the annual criterion. The maximum yearly geometric mean (42 ug/m^3) was recorded at NNE39.

3.2 Chemical Analysis Results:

Annual and seasonal means for sulfate, nitrate, calcium, magnesium and total carbon levels are shown in Table 15. Data for all four years of network operation (1979-1983) have been included for comparison purposes. Annual means for all five parameters in 1983 are comparable to those observed in other years. As in previous years, sulfate and total carbon concentrations are highest during the summer season.

During 1983, sulfate, nitrate, calcium, magnesium and total carbon concentrations are higher for southerly versus northerly winds (Table 16).The chemical analyses results of the selected Whatman 41 filters collected during 1983 for the entire NEMP network are listed in Appendix 1. Total and free carbon results are also listed by station for 1983 in Appendix 1.

4.0 Precipitation Data:

The NEMP precipitation network continued throughout 1983 to collect monthly samples at six sites in the Nanticoke region (Figure 15). Precipitation samples are analyzed for pH, major ions, some nutrients and trace metals. Chemical analysis results for all 1983 precipitation samples are listed in Appendix 2.

Network averaged pH, selected major ion and trace metal concentrations are listed in Table 17. For comparison purposes 1979 to 1983 concentrations are also shown.

As in previous years, there is little annual variation in precipitation concentrations.

5.0 Summary:

This report summarizes the 1983 gaseous data collected by the NEMP, Ontario Hydro and MOE West Central Region networks as well as the 1983 particulate and precipitation data collected by the NEMP network.

The hourly (250 ppb) AQC for SO_2 was exceeded 8 times during 1983. There were no exceedances of the daily (100 ppb) AQC for SO_2. The annual average values at all stations for 1983 were less than half of the annual criterion (20 ppb).

The ozone network recorded 393 hourly exceedances of the ozone AQC (80 ppb), 169 at SW37, 182 at WNW19 and only 42 at NNE39. Ozone exceedances occurred on thirty-eight days during the growing season.

As in previous years, NO_2 and CO levels were well below their respective AQC during 1982.

Annual average TRS concentrations were less than or equal to 1 ppb for all four monitors.

Although the validity of the data is in question the annual average for methane and non-methane hydrocarbon was less than 2 ppm and 1 ppm respectively.

There were 6 TSP exceedances of the daily (120 ug/m^3) AQC during 1983. Two of these exceedances were attributed to industrial emissions, two were related to agricultural activity and two were part of regional episodes. Sulfate, nitrate, calcium, magnesium and total carbon concentrations were higher for southerly versus northerly winds.

The pH for wet deposition in the NEMP network during 1983 was 4.4.

Ambient air quality in the Haldimand-Norfolk region continued to be satisfactory throughout 1983.

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Table 1

Emission Estimates (metric tons per year)

	Particulates					Sulfur Dioxide				
	1979	1980	1981	1982	1983	1979	1980	1981	1982	1983
Ontario Hydro	1,500	2,000	2,400	2,400	2,500	155,000	144,000	181,000	207,000	199,000
Texaco	300	290	280	460	370	8,500	6,800	4,200	6,100	6,430
Stelco	-	106*	191+	321	431	-	170*	338+	2,492	2,949

* coke ovens not operational
+ coke ovens operational for only one month

Table 2

Station Location and Description

Geog Id	Numer Id	Site Name	SO2	O3	NOX	CO	TRS	HC	TSP	COMP HI-VOL	COH	PREC
SW37	22901	Long Point Park	X	X	X	X			X		X	
NNW08	22905	Nanticoke Road	X				X	X				
NO7	22906	Sandusk	X		X							
NNE05	22904	Walpole South School	X				X	X	X	X		
NNE10	22903	Cheapside	X		X		X	X				
NNE39	22902	Binbrook West	X	X	X	X			X		X	X
WNW03	22871	Nanticoke Village	X				X					
SW40	22959	Big Creek							X	X		
W07	22953	Dogs Nest East							X	X		X
NNE22	22960	Dufferin North							X			X
NE16	22957	Fisherville North							X	X		
NE27	22956	Canfield South							X			X
NE41	22958	Canboro East							X			X
NNW06	22963	Stelco North							X	X		
NW03	22961	Nanticoke North							X	X		
E04	22952	Peacock Point Park							X	X		
NNW18	22954	Villa Nova							X			X
ENE17	22955	Rainham Centre South							X	X		
WNW19	22071	Simcoe Horticultural	X	X	X							
N15	22812	Garnet	X									
NNE09	22822	Dry Creek	X									
NNE16	22823	Balmoral	X									
NNE20	22825	Decewsville	X									
NE19	22832	Kohler Road	X									
ENE11	22841	Selkirk	X									
E05	22851	Peacock Point	X									
W13	22861	Port Dover	X									
WNW20	22872	Bloomsburg	X									
NNW11	22882	Jarvis	X									
NNW15	22884	Livingston	X									
N17	22951	Hagersville South							X	X		
ENE18	22842	Rainham Center	X									

NE07	22962	Dry Creek --- Acoustic Sounder Site
NNW12	22883	Jarvis Met Tower --- Meteorological Tower Site

Table 3

Details of SO2 Exceedance Events for 1983

Date	Time (EST)	Monitor	Average SO2 (ppb)	Wind Speed (km/hr)	Wind Dir	Station Load (MW)
APRIL 29	1200	NNW08	252	12	SSE	2926
	1300	NNW08	268	11	SSE	2925
MAY 13	1200	W13	251	21	E	2973
JUNE 22	1100	NNW08	438	11	SSE	2919
	1200	NNW08	411	16	SSE	2930
AUGUST 14	1500	NNW08	818	10	SSE	1819
AUGUST 17	1300	NNE20	291	18	SSW	8472
SEPTEMBER 21	0200	NNE05	820	85	SSW	1188

Hourly AQC for SO2 is 250 ppb
Wind data is from the 85 m level of Jarvis meteorological tower

Table 4

Exceedances of the Hourly SO2 AQC by Station - 1975 to 1983

Station	1975	1976	1977	1978	1979	1980	1981	1982	1983
N07	1	3	0	2	2	0	3	0	0
N15	0	0	0	0	0	1	1	0	0
NNE05	-	-	-	0	0	2	2	1	1
NNE09	4	4	3	6	1	1	4	1	0
NNE16	4	4	1	2	1	2	1	3	0
NNE17	1	0	3	-	-	-	-	-	-
NNE20	-	-	-	0	0	1	0	3	1
NE10	1	1	0	0	-	-	-	-	-
NE19	0	0	0	0	0	0	0	1	0
ENE11	0	0	0	0	0	0	0	0	0
ENE18	0	0	0	0	0	0	0	0	0
E05	0	0	0	0	1	0	1	0	0
W13	0	0	0	1	0	0	0	0	1
WNW03	0	0	0	0	1	0	0	0	0
WNW20	0	2	0	0	0	0	0	0	0
NNW08	0	3	3	2	1	0	2	0	3
NNW11	0	1	1	0	1	0	0	0	0
NNW15	0	2	1	1	0	0	0	0	0
SW37	-	-	-	0	0	0	0	0	0
NNE39	-	-	-	0	0	0	1	0	0
WNW19	0	0	0	0	0	0	0	0	0
NNE10	0	0	0	6	3	1	4	1	0
	---	---	---	---	---	---	---	---	---
	11	20	12	20	11	8	19	10	8

- monitor not in operation
Hourly AQC for SO2 is 250 ppb

Table 5

Sulfur Dioxide (SO2) Data Summary by Station

STATION ID	ARITHMETIC MEAN	MAXIMUM	CONCENTRATION (ppb) NOT EXCEEDED DURING A GIVEN % OF HOURS				# OF HOURS MONITORING	% OF VALID DATA	NUMBER OF EXCEEDANCES	DAILY MAX
			10%	50%	90%	99%				
N07	5	179	0	2	12	41	8760	90.41	0	42
N15	4	198	0	1	9	30	8760	92.35	0	27
NNE05	6	320	0	3	16	48	8760	89.82	1	73
NNE09	4	139	0	1	10	36	8760	95.23	0	39
NNE16	5	221	0	2	14	40	8760	85.90	0	44
NNE20	4	291	0	1	8	37	8760	90.97	1	42
NE19	4	134	0	1	10	35	8760	84.04	0	27
ENE11	5	117	0	2	12	30	8760	92.37	0	30
ENE18	4	94	0	2	11	30	8760	90.99	0	28
E05	5	214	0	2	12	49	8760	92.89	0	75
W13	4	251	0	1	9	32	8760	91.79	1	27
WNW03	3	70	0	1	10	32	8760	88.60	0	36
WNW20	4	211	0	1	9	34	8760	91.35	0	34
NNW08	5	438	0	1	11	36	8760	81.76	5	56
NNW11	4	159	0	1	9	32	8760	91.97	0	32
NNW15	4	207	0	2	11	35	8760	90.07	0	29
WNW19	3	210	0	0	10	30	8706	94.99	0	39
NNE10	4	130	0	0	10	40	8660	99.55	0	32
SW37	4	105	0	1	8	35	7937	75.64	0	36
NNE39	5	280	0	3	11	36	8086	89.53	0	86

concentrations are in ppb
hourly AQC for SO2 is 250 ppb
daily AQC for SO2 is 100 ppb

Table 6

Ozone (O3) Data Summary by Station

Station Id	Year	Conc (ppb) not exceeded during given % of hours				Maximum conc	Annual avg	% Valid Data	# Monitoring Hours	# Exceedances of AQC
		10%	50%	90%	99%					
	1979	13	27	53	89	140	30	67.5	5917	86
	1980	13	29	60	95	123	33	87.4	7678	225
SW37	1981	12	28	55	90	129	31	91.9	8323	159
	1982	14	32	58	86	114	34	93.8	8624	131
	1983	12	26	54	95	136	30	86.8	8540	169
	1979	9	25	46	75	118	27	82.4	6010	34
	1980	7	22	41	69	102	24	74.0	6496	15
NNE39	1981	6	23	43	75	108	24	96.2	8627	44
	1982	7	24	43	67	89	25	97.3	8505	9
	1983	5	21	44	76	116	24	84.1	8677	42
	1979	9	26	50	82	148	28	95.8	8394	96
	1980	9	24	46	75	99	26	93.0	8169	45
WNW19	1981	10	26	50	89	111	29	96.2	8627	138
	1982	12	30	56	88	115	34	96.5	8618	122
	1983	10	27	54	91	123	30	98.4	8703	182

Values are in ppb
Hourly AQC for O3 is 80 ppb

Table 7

Nitrogen Dioxide (NO2) Data Summary by Station

Station Id	Year	Conc (ppb) not exceeded during given % of hours				Maximum conc	Annual avg	% Valid Data	# Monitoring Hours	# Exceedances of AQC
		10%	50%	90%	99%					
	1979	2	7	21	44	79	10	78.8	5543	0
	1980	2	6	14	25	52	7	67.9	6509	0
SW37	1981	2	6	15	31	58	7	N/A	7569	0
	1982	2	6	15	28	50	7	97.4	8621	0
	1983	2	5	13	28	44	6	88.7	7963	0
	1979	2	8	28	47	83	11	93.8	8338	0
	1980	2	7	21	38	63	10	98.9	7284	0
NNE39	1981	1	7	21	47	74	10	N/A	6344	0
	1982	3	7	21	42	71	10	97.2	8827	0
	1983	3	7	20	38	62	9	99.1	7926	0
	1979	1	7	18	30	57	8	96.9	4840	0
	1980	2	8	17	30	57	9	58.4	7248	0
NO7	1981	1	6	17	33	66	8	N/A	4930	0
	1982	2	8	20	37	70	10	54.9	7471	0
	1983	1	6	20	34	55	9	84.3	6633	0
	1979	0	10	20	50	180	13	97.3	8375	0
	1980	0	10	20	40	60	8	97.8	7745	0
NNE10	1981	0	10	20	40	100	10	98.9	8760	0
	1982	0	10	20	40	90	7	73.9	8702	0
	1983	0	10	20	80	50	8	96.1	8784	0
	1979	0	10	20	40	80	10	98.7	8686	0
	1980	0	10	20	40	90	12	96.3	8768	0
WNW19	1981	0	10	20	40	90	14	92.0	6685	0
	1982	0	10	20	40	100	10	91.9	8617	0
	1983	0	10	20	40	80	9	92.2	8698	0

Values are in ppb
Hourly AQC for NO2 is 200 ppb

Table 8

Total Reduced Sulphur (TRS) Data Summary by Station

Station Id	Year	Conc (ppb) not exceeded during given % of hours				Maximum conc	Annual avg	% Valid Data	# Monitoring Hours
		10%	50%	90%	99%				
	1979	0	0	1	3	25	0.4	69.2	5030
	1980	0	0	2	3	14	0.5	76.0	3886
NNE10	1981	0	0	2	3	7	0.4	92.3	4791
	1982	0	0	2	4	9	0.6	90.7	7623
	1983	0	0	1	4	10	0.5	97.7	7921
	1979	0	0	1	3	60	0.4	74.3	5955
	1980	0	0	1	3	9	0.3	67.9	4462
NNE05	1981	0	0	1	3	30	0.3	95.1	7801
	1982	0	0	1	3	12	0.2	99.9	7685
	1983	0	0	0	3	17	0.1	94.1	7438
	1979	0	0	1	3	8	0.3	49.2	3952
	1980	0	0	1	3	34	0.3	71.3	5733
NNW08	1981	0	0	1	2	7	0.3	97.2	7618
	1982	0	0	1	3	7	0.3	93.1	7446
	1983	0	0	0	2	24	0.1	95.8	7179
	1979	N/O	N/O	N/O	N/O	N/O	N/O	N/O	N/O
	1980	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WNW03	1981	0	0	2	6	36	0.6	97.2	7714
	1982	0	0	2	5	46	0.5	88.2	7526
	1983	0	1	3	6	90	1.0	89.5	7649

Values are in ppb
N/O Not Operating
N/A Not Available - station operated only part of the year.

Table 9

Details of TRS Events Exceeding 8 ppb* for 1983

Date	Time (EST)	Monitor	Average TRS (ppb)	Wind Speed (km/hr)	Wind Dir
January 1	1500	WNW03	9	31	SW
28	0400	WNW03	9	calm	calm
February 2	2200	WNW03	24	7	SSW
3	0200	WNW03	9	calm	calm
April 7	1400	WNW03	9	13	WSW
	1800	WNW03	9	17	WSW
27	1600	WNW03	10	24	WSW
	1700	WNW03	20	22	WSW
	1800	WNW03	23	17	WSW
30	2000	WNW03	17	18	WSW
	2100	WNW03	17	17	W
		NNE05	9	17	W
June 23	0100	WNW03	30	calm	calm
	0200	WNW03	90	calm	calm
		NNE05	17		
	0300	WNW03	10		
		NNE05	11	calm	calm
		NNE10	9		
	0500	WNW03	10	calm	calm
	0600	WNW03	18	8	SW
25	2200	WNW03	10	calm	calm
	2300	WNW03	10	calm	calm
26	2000	WNW03	11	18	WSW
	2100	WNW03	11	16	WSW
	2300	WNW03	14	17	WSW
27	0100	WNW03	14	15	WSW
	0200	WNW03	12	17	WSW
July 7	2300	WNW03	12	10	WSW
October 6	0400	WNW03	9	12	SW
	0500	WNW03	16	14	SW
21	0900	NNW08	24	15	ENE
22	1300	NNE10	9	14	SE
	1400	NNE10	9	11	SE
	1500	NNE10	10	10	SE
	1600	NNE10	10	8	ESE
November 24	0500	WNW03	17	24	WSW
	0600	WNW03	11	20	WSW
December 2	1200	WNW03	11	12	WSW
15	0400	WNW03	24	21	WSW
	0500	WNW03	15	20	WSW
22	0300	WNW03	10	19	S

* arbitrarily chosen
Wind data is from the 10m level of the Jarvis Met. Tower

Table 10

Carbon Monoxide (CO) Data Summary by Station

Station Id	Year	Conc (ppm) not exceeded during given % of hours				Maximum conc	Annual avg	% Valid Data	# Monitoring Hours	# Exceedances of AQC
		10%	50%	90%	99%					
	1979	0	0	0	1	6	0.1	90.5	6584	0
	1980	0	0	0	1	2	0.1	90.7	7971	0
SW37	1981	0	0	1	1	2	0.2	94.7	8427	0
	1982	0	0	1	2	4	0.1	95.9	8623	0
	1983	0	0	1	1	3	0.2	90.9	8004	0
	1979	0	0	1	1	4	0.1	88.4	7089	0
	1980	0	0	0	1	3	0.1	88.7	7176	0
NNE39	1981	0	0	0	1	2	0.1	98.9	8718	0
	1982	0	0	0	1	2	0.1	99.9	8275	0
	1983	0	0	1	1	9	0.1	99.2	8602	0

Values are in ppm
Hourly AQC for CO is 30 ppm

Table 11

Methane (CH4) Data Summary by Station

Station Id	Year	Conc (.1ppm) not exceeded during given % of hours				Maximum conc	Annual avg	% Valid Data	# Monitoring Hours
		10%	50%	90%	99%				
	1979	14	16	28	41	46	18	55.2	4057
	1980	13	14	16	18	28	14	78.3	6921
NNE10	1981	13	15	16	19	25	15	91.1	8352
	1982	13	14	16	20	40	15	99.9	8140
	1983	14	16	18	25	47	16	96.3	8385
	1979	11	14	18	39	88	15	81.9	6012
	1980	12	13	15	29	59	14	81.0	7118
NNE05	1981	12	14	16	21	55	14	98.2	7937
	1982	13	15	18	29	34	16	91.0	7355
	1983	12	14	17	20	26	14	96.6	7278
	1979	16	19	22	26	34	19	76.8	2820
	1980	12	15	17	21	32	15	78.3	6874
NNW08	1981	13	15	17	22	39	15	92.9	8258
	1982	12	15	18	22	57	15	73.8	6712
	1983	14	15	17	21	29	15	96.2	8327

Values are in .1 ppm

Table 12

Non-Methane Hydrocarbon Data Summary by Station

Station Id	Year	Conc (.1 ppm) not exceeded during given % of hours				Maximum conc	Annual avg	% Valid Data	# Monitoring Hours
		10%	50%	90%	99%				
	1979	0	2	37	140	180	12	57.2	3776
	1980	1	3	6	9	125	4	74.2	6521
NNE10	1981	2	7	10	14	36	7	89.9	8224
	1982	1	6	11	16	32	6	93.0	8245
	1983	0	2	6	11	170	3	92.9	8398
	1979	4	6	11	16	38	7	81.0	5948
	1980	2	5	9	14	77	6	77.8	6832
NNE05	1981	3	5	8	11	31	5	97.1	7998
	1982	3	5	8	11	16	5	83.1	7301
	1983	2	4	6	10	18	4	89.3	7253
	1979	4	6	8	14	51	6	76.8	2819
	1980	4	7	9	11	18	7	76.4	6710
NNW08	1981	6	8	10	12	19	8	95.8	8253
	1982	2	5	11	13	17	6	75.7	6546
	1983	0	2	4	6	12	2	97.6	8256

Values are in .1 ppm

Table 13

Total Suspended Particulates (TSP) Data Summary By Station

STATION ID	GEOMETRIC MEAN	MAXIMUM	CONCENTRATION NOT EXCEEDED DURING A GIVEN % OF SAMPLE DAYS 10%	50%	90%	99%	STANDARD DEVIATION	NUMBER OF SAMPLES	NUMBER OF EXCEEDANCES
NNE39	42	103	23	42	69	85	1.5	53	0
NNE05	32	134	16	32	63	73	1.7	56	1
N17	32	101	15	30	71	91	1.7	58	0
E04	28	75	13	29	51	54	1.6	55	0
W07	27	106	13	28	54	71	1.8	110	0
NNW18	30	116	16	31	77	87	1.9	58	0
ENE17	30	76	14	31	55	71	1.6	58	0
NE27	39	76	20	42	66	75	1.5	55	0
NE16	33	96	14	36	75	89	1.7	58	0
NE41	35	97	15	38	62	92	1.7	46	0
SW40	32	66	17	33	56	66	1.6	51	0
NNE22	38	113	22	38	70	75	1.5	52	0
NW03	40	176	19	36	93	129	1.9	111	3
NNW06	33	379	14	31	80	111	2.0	119	2

Concentrations are in ug/m3
Daily AQC for TSP is 120 ug/m3

Table 14

Details of TSP Exceedance Events for 1983

Date	Monitor	Average TSP (ug/m3)	Wind Speed (km/hr)	Prevailing Wind Direction
April 27	NW03	129	10 to 25	southwesterly
June 14	NW03	176 *	5 TO 10	southeasterly
	NNW06	379 *		
June 17	NNW06	137	7 TO 15	southerly
June 23	NNE05	137	15 TO 25	south-southwesterly
July 14	NW03	132	10 TO 20	southwesterly

* Suspected cause is agricultural activity
Daily AQC for TSP is 120 ug/m3

Table 15

Annual and Seasonal Distribution of Particulates

		SO4	NO3	Ca	Mg	CT
	1979	3.2 (13)	4.0 (13)	0.78 (15)	0.17 (16)	2.7 (18)
	1980	5.4 (48)	3.8 (48)	0.62 (48)	0.22 (48)	3.9 (40)
Winter	1981	6.1 (46)	3.8 (45)	0.73 (46)	0.19 (46)	4.3 (52)
	1982	4.9 (38)	2.2 (38)	0.77 (38)	0.21 (38)	3.4 (31)
	1983	2.6 (45)	1.7 (45)	0.80 (45)	0.22 (45)	3.6 (41)
	1979	4.5 (28)	2.8 (28)	0.76 (24)	0.20 (24)	3.1 (29)
	1980	4.7 (40)	3.1 (40)	1.11 (40)	0.32 (40)	3.7 (42)
Spring	1981	5.0 (47)	3.2 (47)	1.56 (47)	0.47 (47)	5.0 (51)
	1982	5.2 (47)	2.8 (47)	0.99 (47)	0.30 (47)	4.6 (45)
	1983	4.1 (41)	2.9 (41)	1.23 (41)	0.37 (41)	5.8 (39)
	1979	7.2 (65)	1.3 (62)	0.78 (62)	0.15 (46)	6.4 (43)
	1980	7.5 (34)	2.5 (34)	0.86 (33)	0.19 (38)	6.7 (37
Summer	1981	8.9 (50)	2.0 (50)	0.81 (50)	0.24 (50)	5.9 (50)
	1982	6.5 (48)	1.6 (48)	0.88 (42)	0.27 (42)	7.2 (48)
	1983	7.1 (69)	2.6 (69)	1.13 (69)	0.34 (69)	7.6 (70)
	1979	4.7 (62)	2.4 (62)	0.43 (62)	0.25 (62)	4.3 (57)
	1980	3.0 (29)	2.5 (29)	0.94 (27)	0.19 (27)	3.8 (29)
Fall	1981	4.7 (48)	2.9 (48)	0.96 (48)	0.30 (48)	4.9 (44)
	1982	3.3 (51)	2.1 (51)	0.74 (51)	0.22 (51)	5.2 (51)
	1983	3.9 (41)	1.8 (41)	0.73 (41)	0.23 (41)	5.7 (41)
	1979	5.3	2.1	0.58	0.21	4.5
	1980	4.6	2.2	0.83	0.22	4.4
Annual	1981	5.7	2.8	0.99	0.29	4.7
	1982	4.6	2.2	0.82	0.24	5.3
	1983	4.7	2.2	0.98	0.29	5.9

concentrations are in ug/m3
bracketed values indicate number of cases considered
values are expressed as geometric means
CT IS Total Carbon

Table 16

Distribution of Particulates According to Wind Direction

Parameter	Southerly Wind	Northerly Wind
SO4	7.8 (101)	2.6 (61)
NO3	3.0 (101)	1.5 (69)
Ca	1.2 (101)	0.79 (69)
Mg	0.34 (101)	0.26 (69)
CT	7.5 (102)	4.5 (66)

concentrations are in ug/m3
bracketed values indicate number of cases considered
values expressed are geometric means

Table 17

NEMP Precipitation Data - 1979 to 1983

Parameter	1979 mean	1980 mean	1981 mean	1982 mean	1983 mean
pH	4.0 (51)	4.1 (69)	4.1 (66)	4.1 (64)	4.4 (62)
SO4	5.8 (62)	4.9 (71)	5.2 (65)	4.0 (65)	3.4 (62)
N-NO3	0.88 (67)	0.65 (71)	0.67 (65)	0.55 (65)	0.48 (62)
Ca	0.71 (67)	0.54 (71)	0.45 (65)	0.89 (65)	0.37 (61)
Mg	0.19 (67)	0.14 (72)	0.10 (65)	0.09 (65)	0.09 (61)
K	0.12 (69)	0.08 (72)	0.06 (64)	0.06 (65)	0.05 (61)
Fe	0.07 (70)	0.05 (65)	0.07 (64)	0.11 (61)	0.05 (62)
Zn	0.09 (66)	0.10 (65)	0.01 (64)	0.01 (62)	0.01 (62)

concentrations are in MG/L
( ) number of samples
mean - volume weighted average
pH was converted to HF ion concentration, averaged, then converted back to pH.

Figure 1
Monitoring Stations in the Haldimand-Norfolk Region

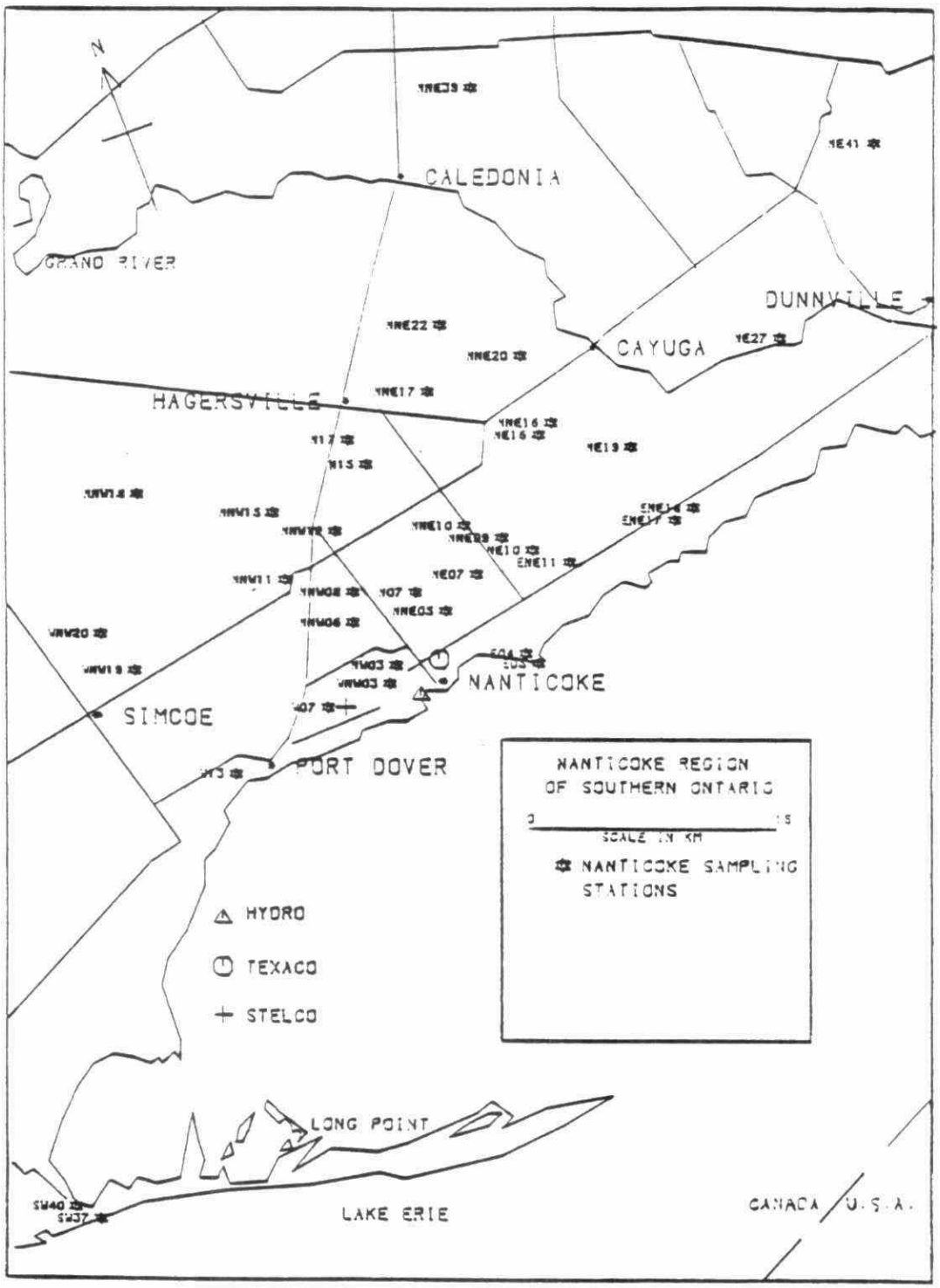


Figure 2

Annual Frequency Distribution of SO_2 for 1983

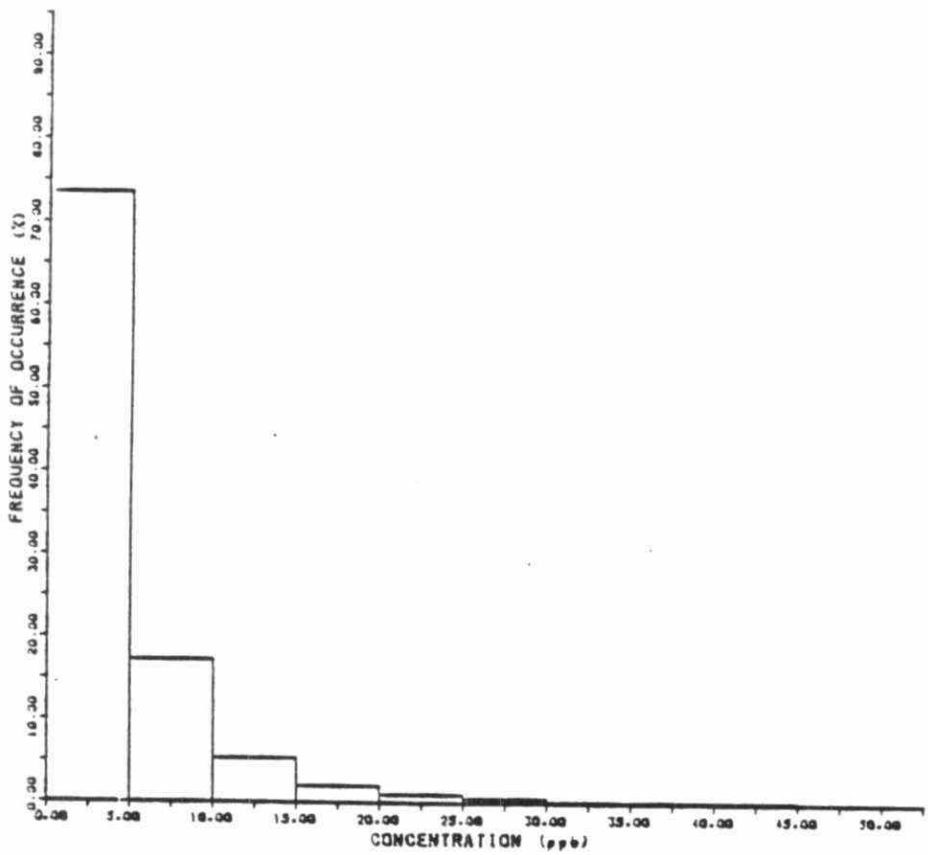


Figure 3
Seasonal Frequency Distribution of SO_2 for 1983

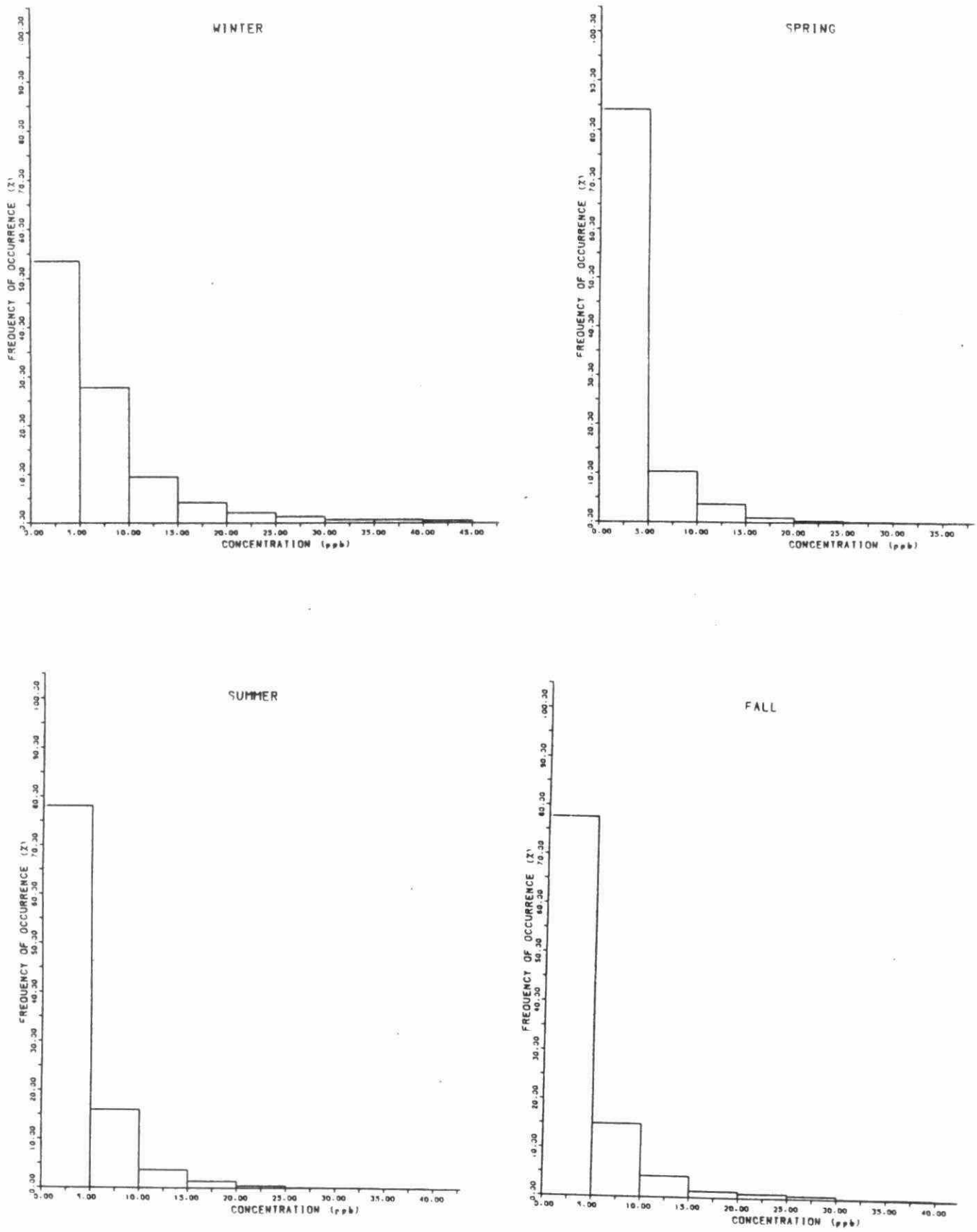


Figure 4

Annual Frequency Distribution of O_3 for 1983

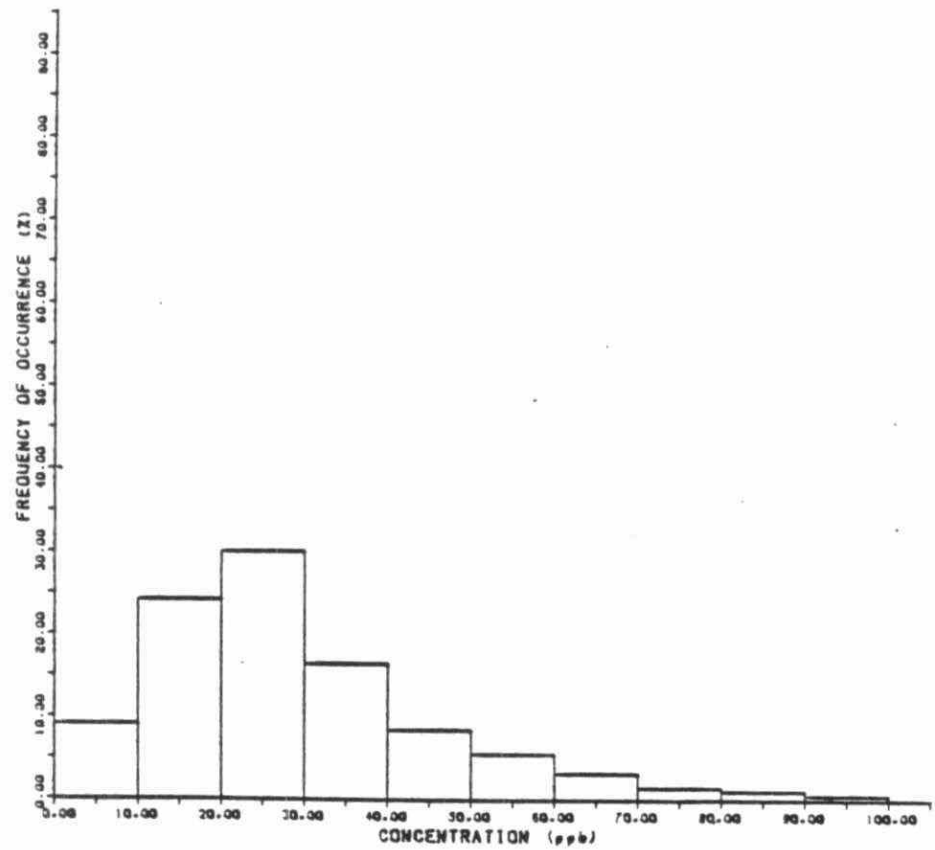


Figure 5
Seasonal Frequency Distribution of O_3 for 1983

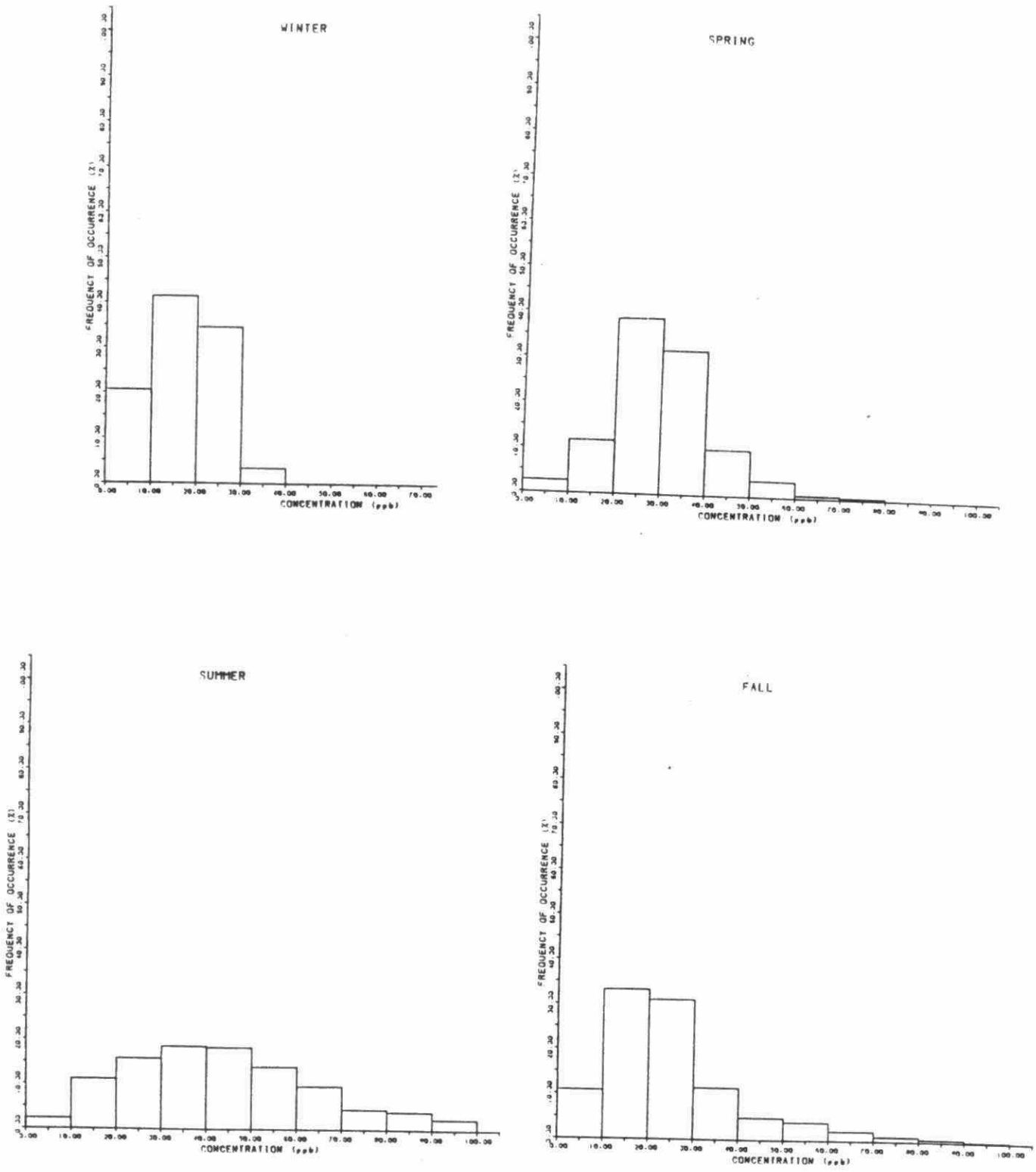


Figure 6

Annual Frequency Distribution of NO_2 for 1983

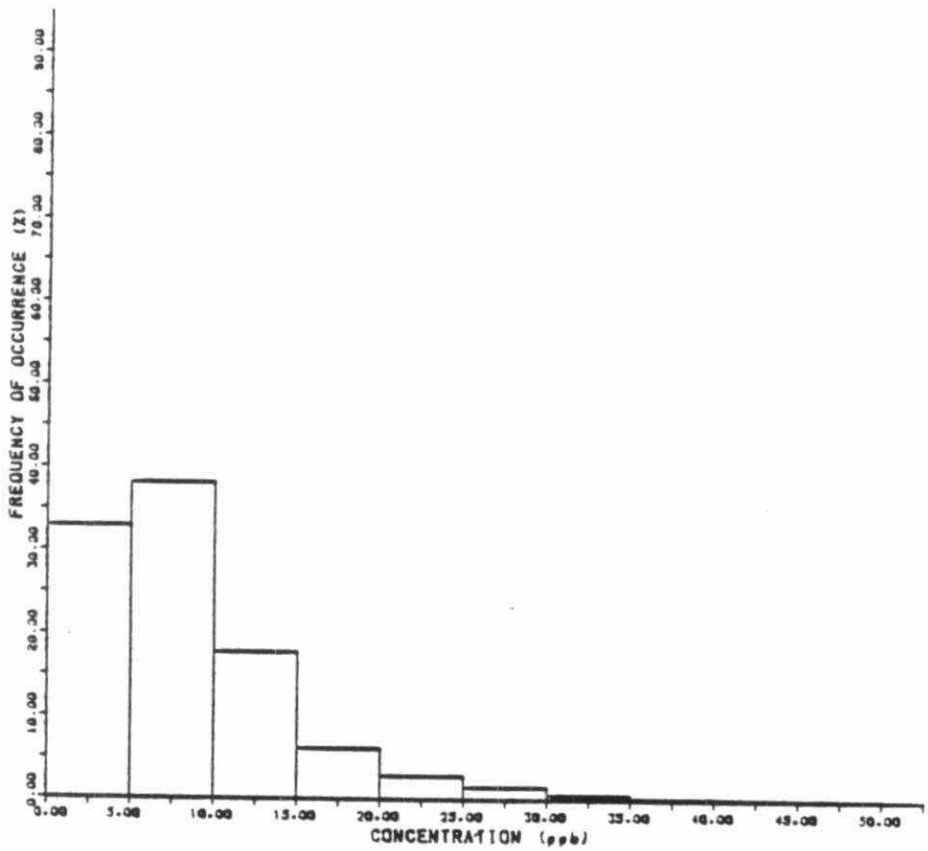


Figure 7

Annual Frequency Distribution of TRS for 1983

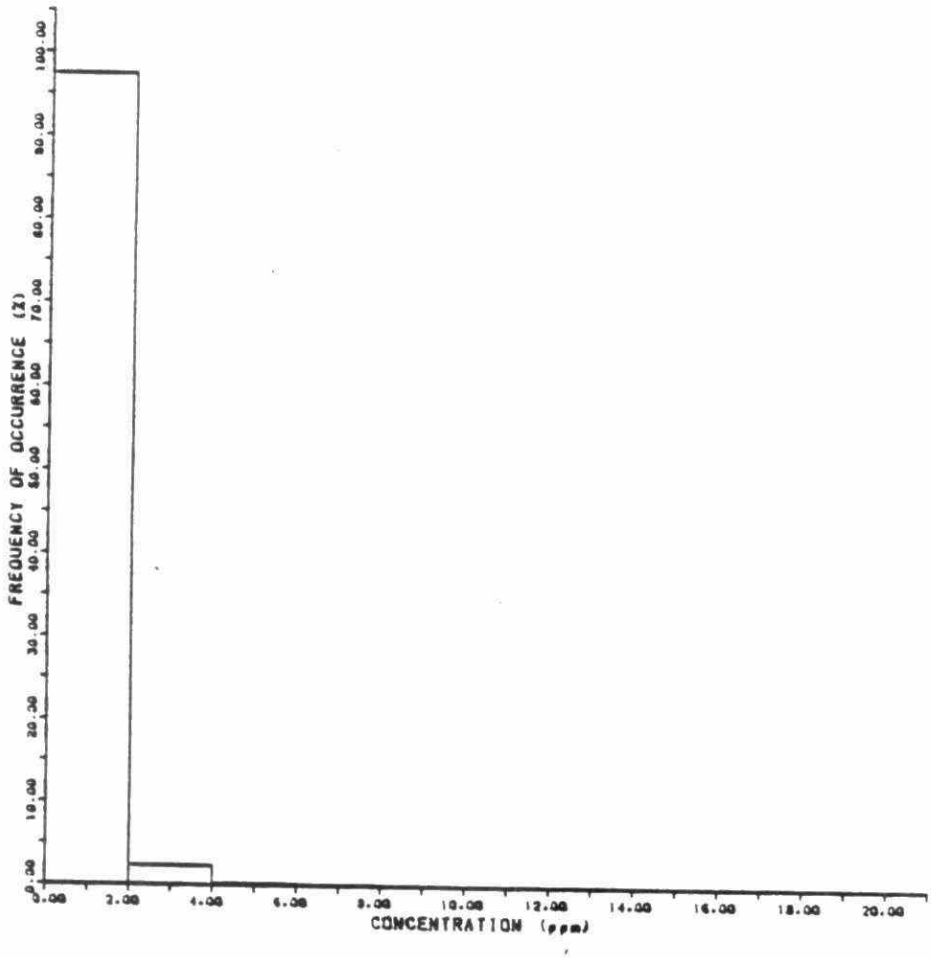


Figure 8

Annual Frequency Distribution of CO for 1983

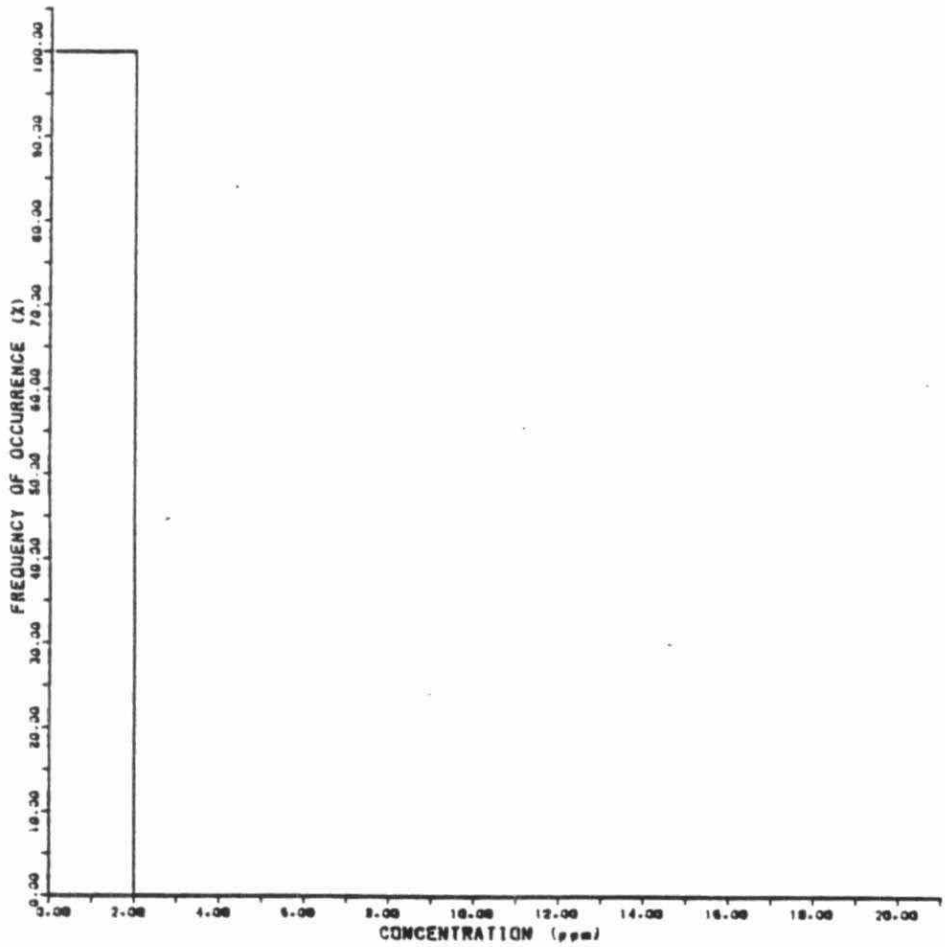


Figure 9

Annual Frequency Distribution of CH_4 for 1983

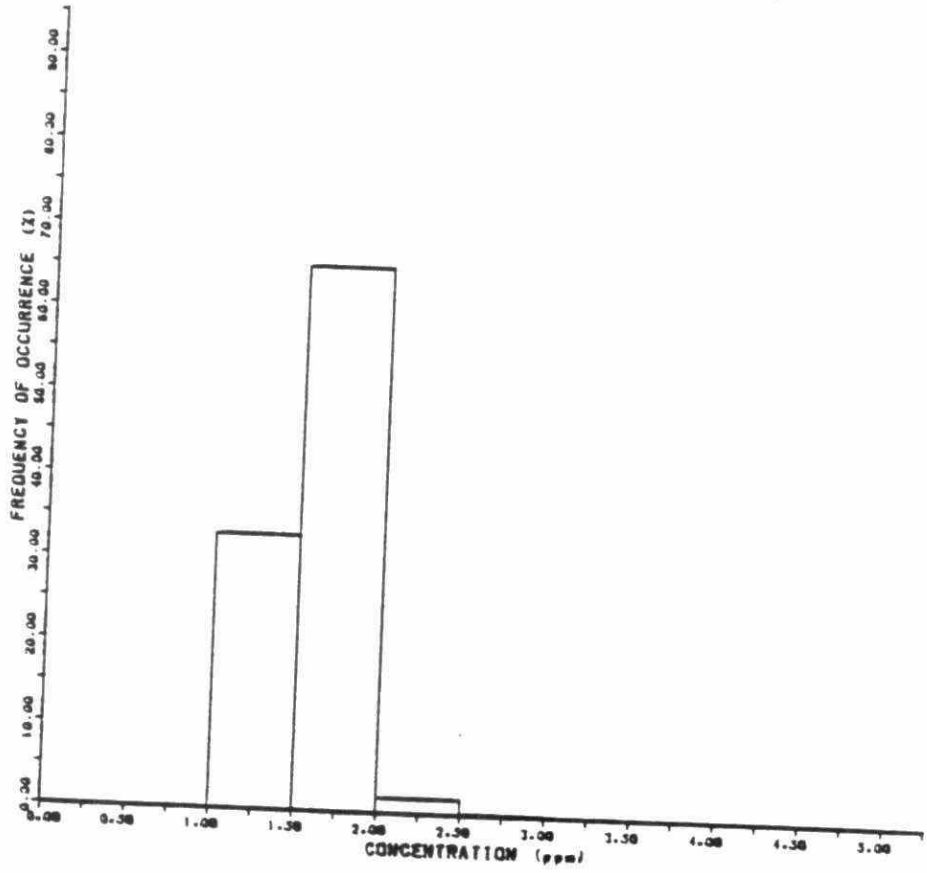


Figure 10

Annual Frequency Distribution of NMHC for 1983

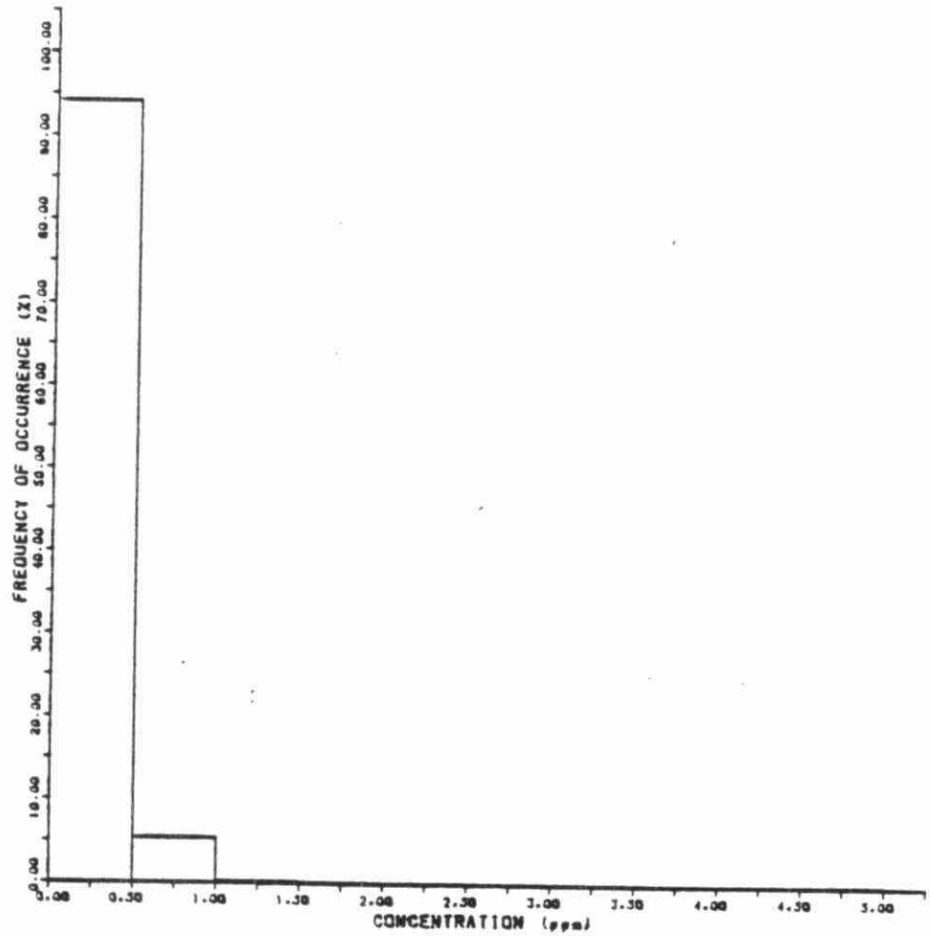


Figure 11

HI-VOL SAMPLING NETWORK

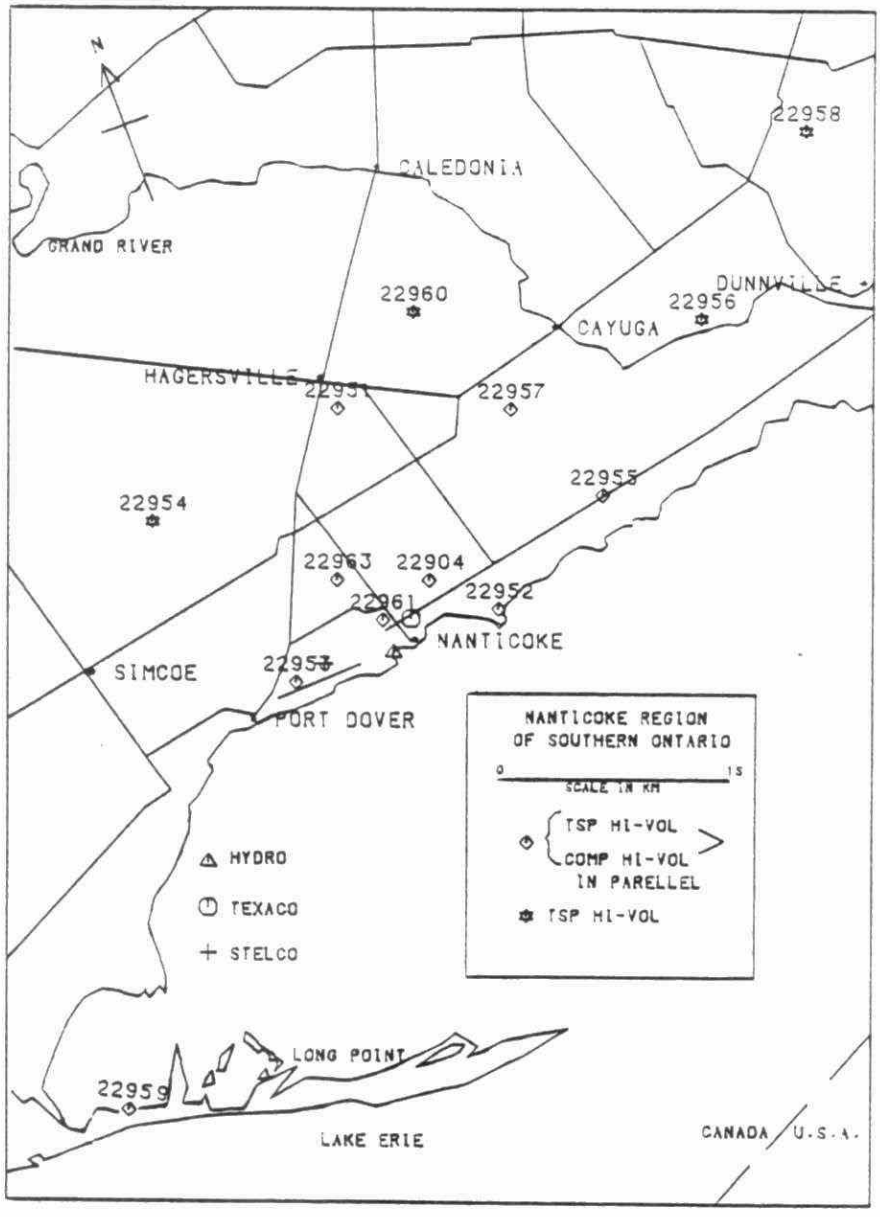


Figure 12

Annual Frequency Distribution of TSP for 1983

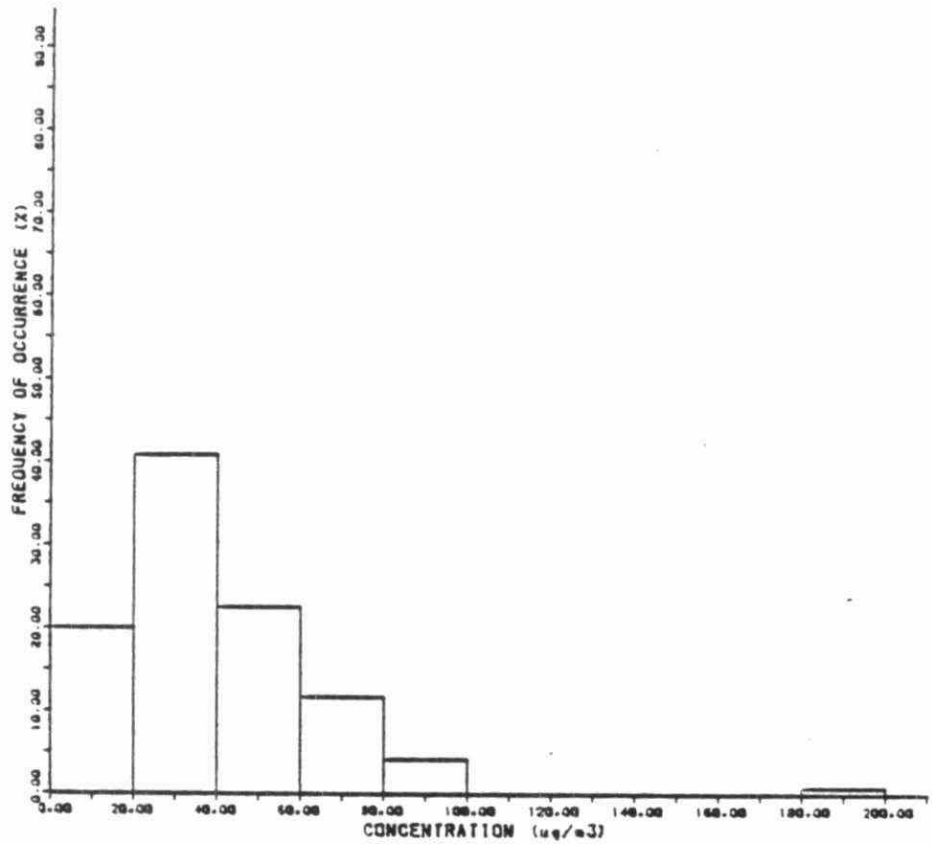


Figure 13
Seasonal Frequency Distribution of TSP for 1983

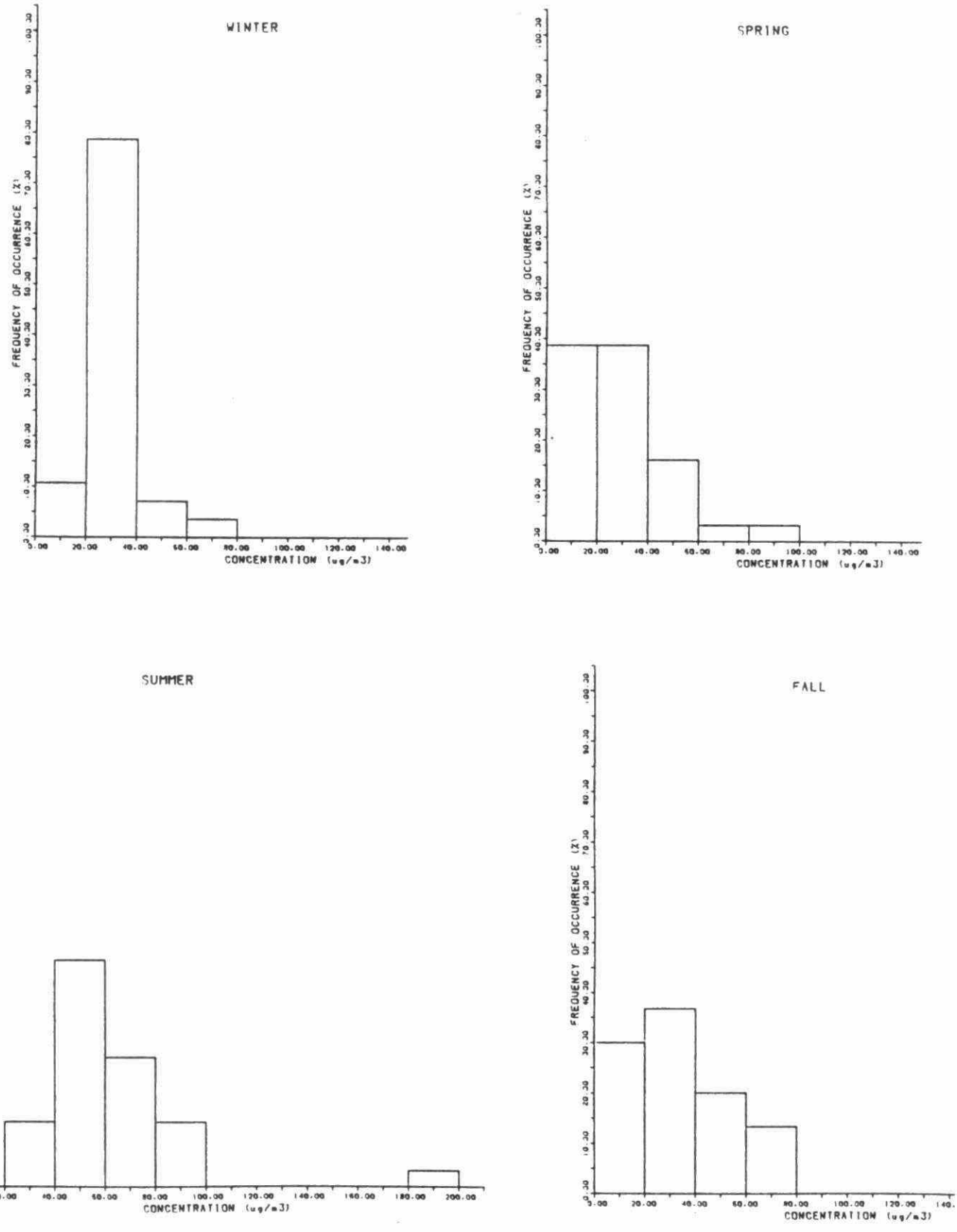


Figure 14

NEMP NETWORK TSP--
MEAN MONTHLY CONCENTRATIONS

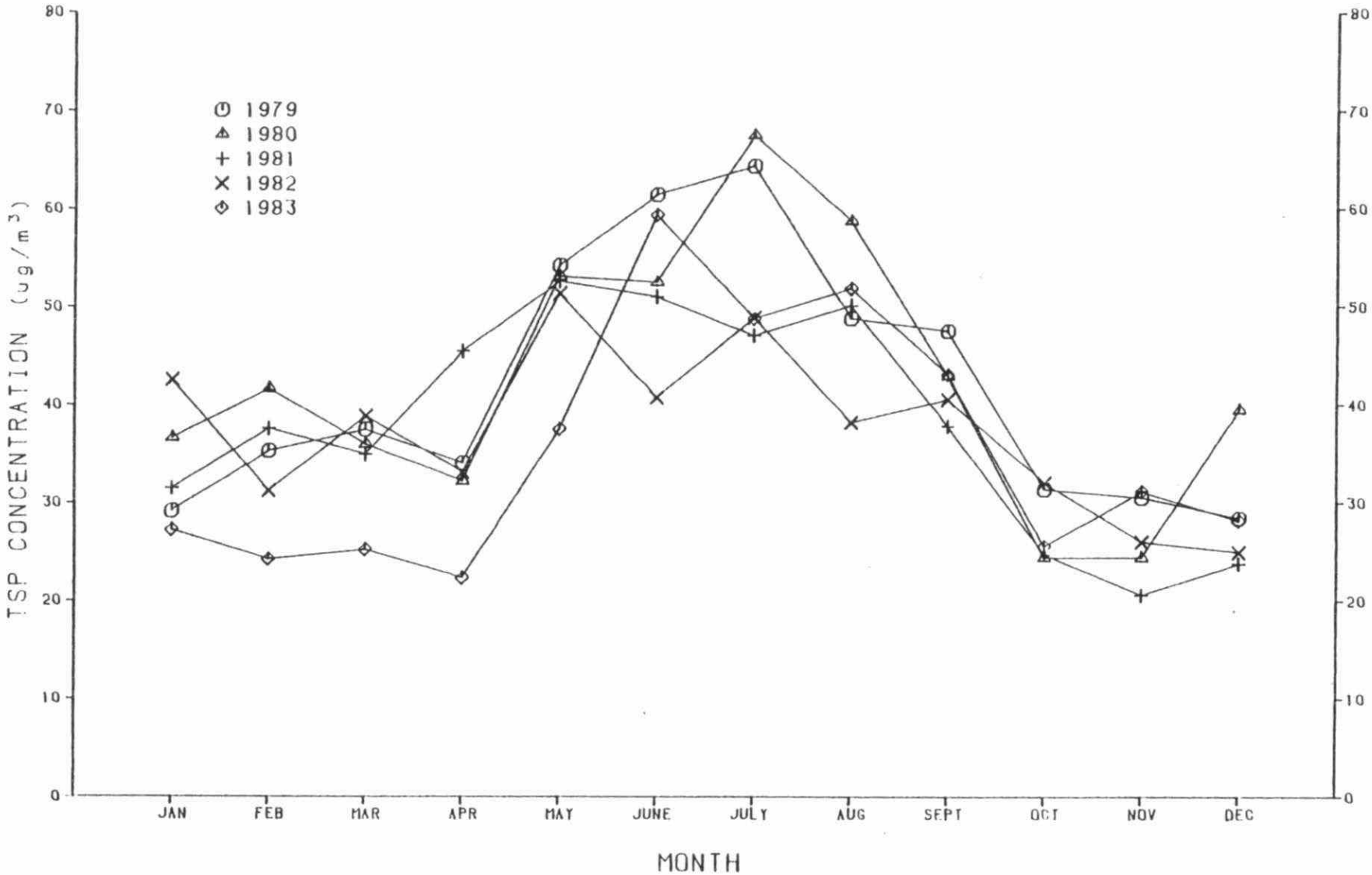
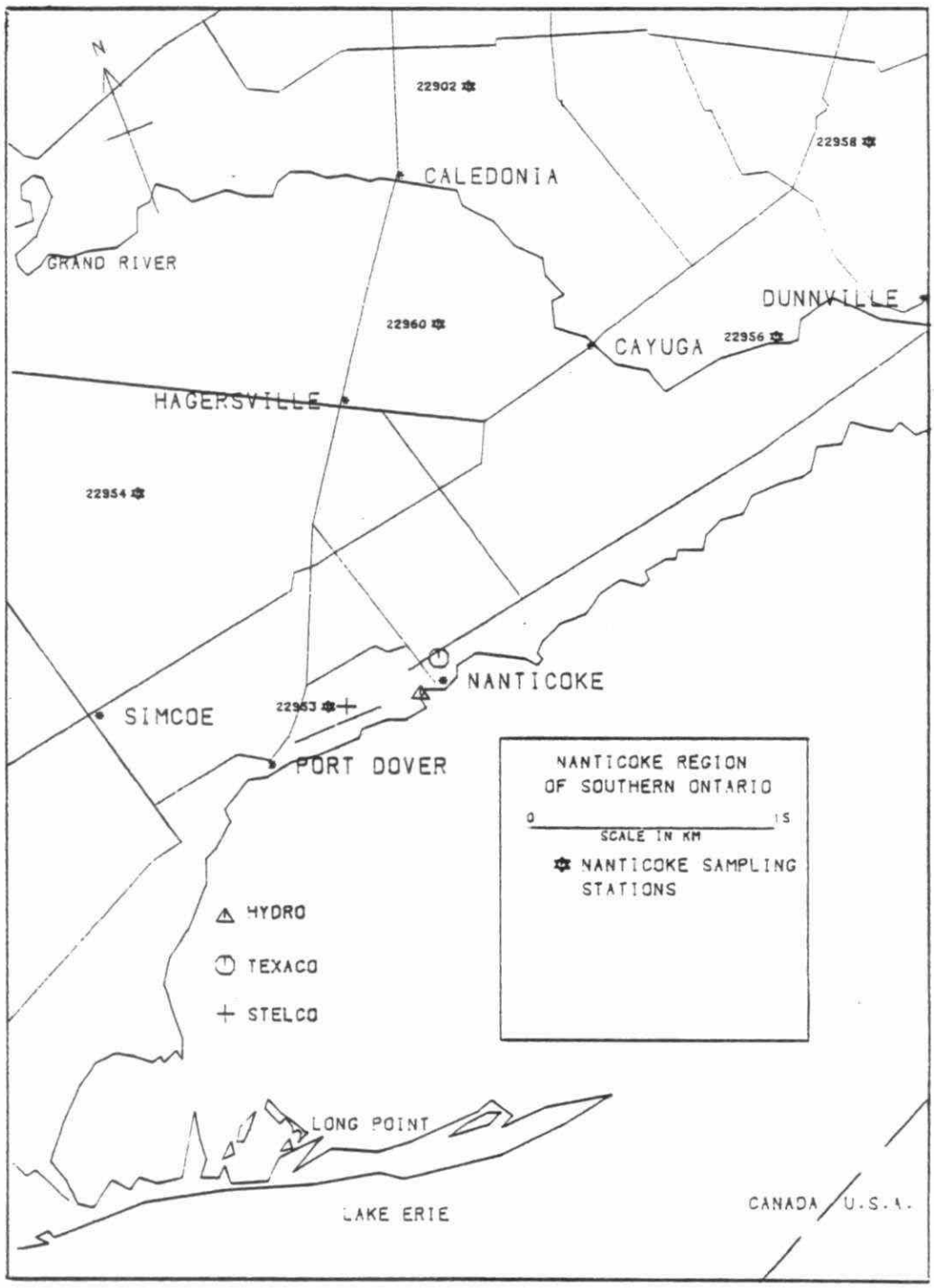


Figure 15

NEMP PRECIPITATION SAMPLING NETWORK



Appendix 1

NEMP PARTICULATES DATA COLLECTED DURING JANUARY TO DECEMBER 1983

Sampling dates were chosen according to the daily wind direction. Wind directions were obtained from the 10 m level of the Jarvis meteorological tower. The most frequent direction during the 24 hour sampling period was used. (N/A) corresponds to invalid or missing data while (BDL) represents concentrations reported as below the detection limit. Geometric means were not calculated for elements which reported in excess of 25% of the data below the detection limit. If less than 25 % of the data are below the detection limit then one half the value of the detection limit was used to calculate the geometric mean. All concentrations are expressed in ug/m^3 and are listed station by station.

It should be noted here that, due to the interference between nitric acid and free carbon (during laboratory analysis), the free carbon results and the free carbon to total carbon ratios are somewhat less than expected.

1983 Particulate Trace Metal Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	AL	CA	CD	CR	CU	FE	MG	MN	NI	PB	SI	ZN
22904	83/ 1/ 6	SW	.198	1.300	.001	.001	.026	.327	.255	.016	.002	.075	1.073	N/A
22904	83/ 1/12	NW	.285	.730	BDL	BDL	.013	.307	.283	.010	BDL	.007	.659	N/A
22904	83/ 2/23	NW	.037	.450	.001	BDL	.073	.110	.159	.010	BDL	.024	.482	N/A
22904	83/ 3/ 1	NE	.347	2.380	.003	.003	.134	1.260	.832	.057	BDL	.214	2.080	N/A
22904	83/ 3/31	NE	.743	3.240	.002	.008	.047	.992	1.030	.038	.007	.042	.365	N/A
22904	83/ 5/ 6	S	.290	1.660	.001	BDL	.319	.498	.446	.019	.007	.044	1.994	N/A
22904	83/ 6/11	S	.835	2.530	.002	.003	.296	1.550	.621	.051	BDL	.093	4.324	N/A
22904	83/ 6/29	NE	.453	1.620	.001	BDL	.006	.631	.504	.027	.004	.038	1.680	N/A
22904	83/ 7/11	SW	.139	1.618	.001	.001	.010	.713	.429	.036	BDL	.034	1.400	N/A
22904	83/ 7/23	SSW	.153	1.457	.001	.001	.044	.524	.434	.020	BDL	.045	1.200	N/A
22904	83/ 8/ 4	SW	.156	.721	.001	.002	.008	.474	.224	.021	BDL	.036	1.000	N/A
22904	83/ 8/22	NW	.148	.607	BDL	BDL	.008	.274	.246	.011	.003	.031	1.000	N/A
22904	83/ 9/21	WNW	.185	.920	BDL	.001	.002	.220	.089	.004	BDL	.013	.700	N/A
22904	83/10/ 3	SW	.379	1.480	.001	.001	.003	.916	.365	.039	BDL	.042	3.900	N/A
22904	83/10/ 9	NE	.029	.145	BDL	BDL	.002	.056	.061	.002	BDL	.011	.200	N/A
22904	83/10/21	NE	.181	1.140	BDL	.001	.008	.257	.536	.013	.003	.040	1.200	N/A
ARITH MEAN			.285	1.387	.001	.002	.062	.569	.406	.023	.004	.049	1.454	N/A
STD DEV			.221	.829	.001	.001	.099	.410	.254	.016	.002	.047	1.133	N/A
GEO MEAN			.206	1.088	.001	.001	.018	.420	.323	.017	.004	.036	1.093	N/A
MAXIMUM			.835	3.240	.003	.008	.319	1.550	1.030	.057	.007	.214	4.324	N/A
MINIMUM			.029	.145	.001	.001	.002	.056	.061	.002	.002	.007	.200	N/A
# OF SAMPLE			16	16	11	10	16	16	16	16	6	16	16	0

1983 Particulate Trace Metal Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	AL	CA	CD	CR	CU	FE	MG	MN	NI	PB	SI	ZN
22951	83/ 1/ 6	SW	.177	.940	.001	BDL	.013	.247	.334	.013	BDL	.076	1.177	N/A
22951	83/ 1/12	NW	.188	1.420	.001	BDL	.012	.204	.521	.011	BDL	.011	.620	N/A
22951	83/ 2/23	NW	.084	.124	BDL	BDL	.013	.006	.064	.005	BDL	.020	.325	N/A
22951	83/ 3/ 1	NE	.449	6.670	.008	.004	.061	2.670	.991	.105	.007	.298	2.575	N/A
22951	83/ 3/31	NE	.223	1.410	.001	BDL	.005	.268	.484	.019	.004	.027	1.033	N/A
22951	83/ 4/30	S	.180	.403	.001	BDL	.014	.318	.228	.022	.005	.048	.842	N/A
22951	83/ 5/ 6	S	.350	2.870	.001	.003	.018	.857	.832	.041	.006	.064	2.523	N/A
22951	83/ 5/30	SW	.504	3.050	BDL	BDL	.008	.485	.231	.014	BDL	.034	2.610	N/A
22951	83/ 6/ 5	SW	.118	.424	BDL	BDL	.018	.167	.148	.008	BDL	.040	.665	N/A
22951	83/ 6/11	S	.618	3.360	.001	.004	.044	1.330	.779	.053	BDL	.120	3.844	N/A
22951	83/ 6/29	NE	.107	.650	.001	BDL	.082	.160	.259	.010	BDL	.028	.704	N/A
22951	83/ 7/11	SW	.344	2.678	BDL	BDL	.066	.591	1.148	.018	BDL	.049	3.500	N/A
22951	83/ 7/23	SSW	.144	1.562	.001	BDL	.063	.491	.493	.020	BDL	.060	1.600	N/A
22951	83/ 8/ 4	SW	.111	.423	BDL	.003	.069	.273	.193	.009	BDL	.044	.800	N/A
22951	83/ 8/16	SSW	.296	2.256	.001	.003	.051	.652	.775	.020	BDL	.067	2.400	N/A
22951	83/ 8/22	NW	.082	.330	BDL	.002	.061	.366	.171	.006	.004	.032	.800	N/A
22951	83/ 9/ 9	SW	.343	1.112	BDL	BDL	.060	.491	.392	.016	BDL	.046	2.800	N/A
22951	83/ 9/21	WNW	.099	.342	BDL	.001	.044	.327	.085	.003	BDL	.012	.300	N/A
22951	83/10/ 3	SW	.577	2.682	.001	.002	.042	.754	1.030	.030	BDL	.057	5.100	N/A
22951	83/10/ 9	NE	.089	.336	BDL	.001	.016	.135	.073	.006	BDL	.014	.300	N/A
22951	83/10/21	NE	.208	1.267	BDL	.002	.023	.288	.616	.013	.004	.036	1.400	N/A
ARITH MEAN			.246	1.684	.001	.003	.035	.525	.470	.021	.005	.056	1.710	BDL
STD DEV			.167	1.515	.001	.001	.022	.561	.331	.022	.001	.059	1.302	BDL
GEO MEAN			.194	1.052	.001	.002	.027	.330	.344	.015	.005	.041	1.244	BDL
MAXIMUM			.618	6.670	.008	.005	.069	2.670	1.148	.105	.007	.298	5.100	BDL
MINIMUM			.089	.124	.001	.001	.005	.006	.044	.009	.004	.011	.300	BDL
# OF SAMPLE			21	21	11	10	21	21	21	21	6	21	21	0

N/A - data not available
BDL - below detection limit

1983 Particulate Trace Metal Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	AL	CA	CD	CR	CU	FE	MG	MN	NI	PB	SI	ZN
22952	83/ 1/ 6	SW	.128	.970	.001	.002	.131	.357	.152	.014	BDL	.083	.935	N/A
22952	83/ 1/12	NW	.113	.320	BDL	BDL	.059	.135	.152	.010	BDL	.006	.677	N/A
22952	83/ 2/23	NW	.094	.876	.001	.008	.662	.281	.265	.013	BDL	.038	.264	N/A
22952	83/ 3/31	NE	.084	.070	BDL	.002	.109	.072	.042	.007	.004	.022	.844	N/A
22952	83/ 4/30	S	.084	.155	BDL	BDL	.786	.149	.096	.007	.004	.024	.658	N/A
22952	83/ 5/ 6	S	.151	.960	.002	.001	1.910	.290	.232	.014	.004	.030	1.314	N/A
22952	83/ 5/30	SW	.368	.140	.002	.002	1.770	.410	.102	.012	BDL	.023	3.066	N/A
22952	83/ 6/ 5	SW	.073	.090	.001	.001	1.170	.176	.052	.008	BDL	.044	.769	N/A
22952	83/ 6/11	S	.216	1.090	.001	BDL	2.810	.454	.240	.019	BDL	.058	2.132	N/A
22952	83/ 6/29	NE	.086	.430	.001	.004	.088	.157	.160	.009	.006	.027	.657	N/A
22952	83/ 7/11	SW	.104	.840	BDL	BDL	.076	.499	.198	.021	BDL	.033	.700	N/A
22952	83/ 7/23	SSW	.131	1.446	.001	.001	.070	.519	.379	.022	BDL	.044	1.200	N/A
22952	83/ 8/ 4	SW	.141	.208	.001	.001	.047	.249	.098	.008	BDL	.038	.800	N/A
22952	83/ 8/22	NW	.214	.388	.001	.001	.090	.357	.228	.012	BDL	.032	1.000	N/A
22952	83/ 9/ 9	SW	.256	.495	.001	.001	.013	.417	.157	.018	BDL	.047	2.400	N/A
22952	83/ 9/21	WNW	.146	.326	BDL	.001	.061	.164	.097	.008	BDL	.013	.500	N/A
22952	83/10/ 3	SW	.279	.656	BDL	.002	.021	.437	.177	.018	BDL	.036	2.200	N/A
22952	83/10/ 9	NE	.030	.158	BDL	BDL	.049	.069	.043	.003	BDL	.010	.100	N/A
22952	83/10/21	NE	.193	.528	BDL	BDL	.080	.184	.206	.009	.004	.028	.800	N/A
ARITH MEAN			.146	.544	.001	.002	.524	.284	.162	.012	.004	.033	1.106	N/A
STD DEV			.083	.384	.000	.002	.798	.141	.083	.005	.001	.017	.768	N/A
GEO MEAN			.128	.395	.001	.002	.150	.248	.138	.011	.004	.029	.860	N/A
MAXIMUM			.368	1.446	.002	.008	2.810	.519	.379	.022	.006	.083	3.066	N/A
MINIMUM			.030	.070	.001	.001	.013	.069	.042	.003	.004	.006	.100	N/A
# OF SAMPLE			19	19	11	18	19	19	19	19	5	19	19	0

1983 Particulate Trace Metal Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	AL	CA	CD	CR	CU	FE	MG	MN	NI	PB	SI	ZN
22953	83/ 1/ 6	SW	.119	.790	.001	.001	.172	.240	.118	.011	BDL	.069	.964	N/A
22953	83/ 1/12	NW	.116	.980	.001	BDL	.078	.128	.172	.007	BDL	.010	.670	N/A
22953	83/ 2/23	NW	.018	.150	.001	BDL	.083	.044	.040	.004	BDL	.019	.212	N/A
22953	83/ 3/ 1	NE	.178	2.530	.002	.002	.031	1.040	.419	.050	.008	.163	1.574	N/A
22953	83/ 3/31	NE	.127	.158	.001	.002	.010	.412	.394	.036	.005	.023	.896	N/A
22953	83/ 4/30	S	.073	.260	.001	BDL	.020	.315	.073	.015	.004	.029	.619	N/A
22953	83/ 5/ 6	S	.216	2.160	.001	BDL	.096	.820	.363	.035	BDL	.039	1.487	N/A
22953	83/ 5/30	SW	.467	.309	BDL	BDL	.040	.479	.164	.015	BDL	.015	2.912	N/A
22953	83/ 6/ 5	SW	.136	.420	BDL	BDL	.050	.250	.122	.011	BDL	.032	.751	N/A
22953	83/ 6/11	S	.284	2.480	.001	BDL	.170	.684	.380	.090	BDL	.071	2.464	N/A
22953	83/ 6/29	NE	.161	2.040	.001	BDL	.036	.586	.441	.042	BDL	.021	.973	N/A
22953	83/ 7/11	SW	.110	.658	BDL	BDL	.055	.275	.186	.011	BDL	.028	1.000	N/A
22953	83/ 7/23	SSW	.089	.885	BDL	.002	.133	.210	.240	.008	BDL	.041	.800	N/A
22953	83/ 8/ 4	SW	.117	.241	.001	.001	.107	.268	.108	.006	BDL	.032	.800	N/A
22953	83/ 8/16	SSW	.740	1.288	.001	.002	.097	.598	.245	.023	.003	.056	1.600	N/A
22953	83/ 8/22	NW	.179	.862	BDL	BDL	.067	.444	.230	.017	BDL	.032	.900	N/A
22953	83/ 9/ 9	SW	.267	.778	BDL	BDL	.060	.488	.284	.019	BDL	.049	2.600	N/A
22953	83/10/ 3	SW	.370	1.007	BDL	.001	.017	.596	.266	.023	BDL	.039	3.100	N/A
22953	83/10/ 9	NE	.050	.192	BDL	BDL	.017	.152	.054	.003	BDL	.012	.300	N/A
22953	83/10/21	NE	.280	1.489	BDL	.001	.015	.371	.468	.018	.004	.028	1.400	N/A
ARITH MEAN			.201	.988	.001	.001	.065	.419	.236	.019	.005	.040	1.299	BDL
STD DEV			.163	.749	BDL	.001	.049	.248	.131	.018	.002	.033	.823	BDL
GEO MEAN			.151	.704	.001	.001	.048	.341	.193	.015	.005	.032	1.053	BDL
MAXIMUM			.740	2.530	.002	.002	.172	1.040	.468	.050	.008	.163	3.100	BDL
MINIMUM			.018	.150	.001	.001	.010	.044	.040	.003	.003	.010	.212	BDL
# OF SAMPLE			20	20	11	8	20	20	20	20	5	20	20	0

N/A - data not available
BDL - below detection limit

1983 Particulate Trace Metal Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	AL	CA	CD	CR	CU	FE	MG	MN	NI	PB	SI	ZN
22955	83/ 1/ 6	SW	.184	.950	.001	BDL	.066	.273	.151	.010	BDL	.078	930	N/A
22955	83/ 1/12	NW	.179	1.420	.001	BDL	.051	.160	.590	.007	BDL	.013	986	N/A
22955	83/ 2/23	NW	.029	.208	BDL	BDL	.037	.046	.091	.004	BDL	.012	144	N/A
22955	83/ 3/ 1	NE	.426	4.610	.001	BDL	.134	1.330	1.510	.058	BDL	.184	2.885	N/A
22955	83/ 3/31	NE	.221	2.080	BDL	BDL	.066	.397	.746	.019	BDL	.042	1.102	N/A
22955	83/ 4/30	S	.137	.325	.001	BDL	.063	.203	.104	.007	BDL	.030	672	N/A
22955	83/ 5/ 6	S	.292	1.390	BDL	BDL	.124	.421	.399	.015	.006	.050	1.814	N/A
22955	83/ 5/30	SW	.415	.381	BDL	BDL	.058	.420	.151	.010	BDL	.013	910	N/A
22955	83/ 6/ 5	SW	.138	.326	.001	.007	.176	.230	.117	.008	BDL	.035	3.852	N/A
22955	83/ 6/11	S	.341	1.490	.001	BDL	.144	.498	.404	.017	BDL	.084	1.970	N/A
22955	83/ 6/29	NE	.257	.856	BDL	BDL	.168	.376	.309	.012	BDL	.046	1.750	N/A
22955	83/ 7/11	SW	.122	1.020	BDL	BDL	.217	.365	.464	.012	BDL	.036	1.500	N/A
22955	83/ 7/23	SSW	.100	.804	BDL	BDL	.327	.323	.277	.011	BDL	.066	1.200	N/A
22955	83/ 8/ 4	SW	.077	.101	BDL	.001	.255	.138	.074	.005	BDL	.033	600	N/A
22955	83/ 8/16	SSW	.169	.402	.001	.002	.271	.443	.157	.009	BDL	.048	1.600	N/A
22955	83/ 8/22	NW	.280	.359	BDL	BDL	.178	.135	.180	.006	.004	.029	600	N/A
22955	83/ 9/ 9	SW	.385	.612	BDL	.001	.143	.480	.218	.019	BDL	.049	2.900	N/A
22955	83/ 9/21	WNW	.071	.140	BDL	BDL	.128	.054	.049	.002	BDL	.013	300	N/A
22955	83/10/ 3	SW	.399	.770	.001	.002	.104	.524	.228	.020	BDL	.040	3.000	N/A
22955	83/10/ 9	NE	.067	.225	BDL	.002	.197	.098	.091	.008	BDL	.015	300	N/A
22955	83/10/21	NE	.177	.876	BDL	.001	.178	.248	.418	.011	.004	.040	1.100	N/A
ARITH MEAN			.207	.982	.001	.002	.147	.342	.320	.013	.005	.046	1.434	N/A
STD DEV			.120	.961	.000	.002	.076	.264	.321	.011	.001	.037	984	N/A
GEO MEAN			.169	.680	.001	.002	.126	.262	.222	.010	.005	.036	1.085	BDL
MAXIMUM			.426	4.610	.001	.007	.327	1.330	1.510	.058	.006	.184	3.852	N/A
MINIMUM			.029	.101	.001	.001	.037	.046	.049	.002	.004	.012	.144	N/A
# OF SAMPLE			21	21	8	7	21	21	21	21	3	21	21	0

1983 Particulate Trace Metal Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	AL	CA	CD	CR	CU	FE	MG	MN	NI	PB	SI	ZN
22957	83/ 1/ 6	SW	.171	1.670	.001	BDL	.011	.268	.382	.011	BDL	.066	.997	N/A
22957	83/ 1/12	NW	.179	1.490	BDL	BDL	.006	.176	.374	.007	BDL	.018	.977	N/A
22957	83/ 2/23	NW	.028	.386	BDL	BDL	.004	.059	.100	.003	BDL	.013	.179	N/A
22957	83/ 3/ 1	NE	.331	2.730	.001	BDL	.033	1.220	.916	.053	BDL	.173	2.067	N/A
22957	83/ 4/30	S	.171	.780	BDL	BDL	.015	.308	.278	.010	BDL	.040	.935	N/A
22957	83/ 5/ 6	S	.249	2.660	BDL	BDL	.021	.460	1.030	.016	BDL	.057	2.127	N/A
22957	83/ 5/30	SW	.502	1.850	BDL	BDL	.023	.541	.827	.015	BDL	.013	4.320	N/A
22957	83/ 6/ 5	SW	.538	3.680	.001	BDL	.057	.962	1.400	.029	BDL	.090	1.213	N/A
22957	83/ 6/11	S	.294	1.530	BDL	BDL	.027	.439	.653	.017	BDL	.044	4.241	N/A
22957	83/ 6/29	NE	.103	.927	.001	BDL	.047	.203	.321	.008	BDL	.037	.725	N/A
22957	83/ 7/11	SW	.268	3.969	BDL	BDL	.020	.597	2.036	.022	BDL	.030	3.500	N/A
22957	83/ 7/23	SSW	.115	1.923	.001	BDL	.049	.396	.823	.013	BDL	.046	1.700	N/A
22957	83/ 8/ 4	SW	.123	.390	.001	BDL	.087	.257	.185	.009	BDL	.063	800	N/A
22957	83/ 8/16	SSW	.294	2.013	.001	.001	.048	.658	1.122	.012	BDL	.093	2.500	N/A
22957	83/ 8/22	NW	.814	.677	BDL	BDL	.039	.199	.287	.007	.007	.040	.700	N/A
22957	83/ 9/ 9	SW	.432	3.279	.001	.001	.057	.758	1.746	.025	BDL	.052	3.800	N/A
22957	83/ 9/21	WNW	.058	.284	BDL	.003	.044	.139	.107	.003	BDL	.008	400	N/A
22957	83/10/ 3	SW	.494	2.939	.001	.002	.013	.731	1.506	.023	BDL	.038	4.700	N/A
22957	83/10/ 9	NE	.046	.383	BDL	BDL	.081	.079	.147	.002	BDL	.012	.400	N/A
22957	83/10/21	NE	.203	1.252	BDL	.002	.026	.287	.627	.013	.004	.051	1.500	N/A
ARITH MEAN			.240	1.738	.001	.002	.034	.438	.734	.015	.006	.049	1.889	N/A
STD DEV			.131	1.130	.000	.001	.021	.301	.557	.011	.001	.037	1.424	N/A
GEO MEAN			.186	1.502	.001	.002	.026	.335	.598	.011	.005	.038	1.351	N/A
MAXIMUM			.538	3.969	.001	.003	.087	1.220	2.036	.053	.007	.173	4.700	N/A
MINIMUM			.028	.284	.001	.001	.004	.059	.100	.002	.004	.008	.179	N/A
# OF SAMPLE			20	20	9	5	20	20	20	20	2	20	20	0

N/A - data not available
BDL - below detection limit

1983 Particulate Trace Metal Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	AL	CA	CD	CR	CU	FE	MG	MN	NI	PB	SI	ZN
22959	83/ 1/ 6	SW	.172	.780	.001	BDL	.019	.305	.123	.012	BDL	.062	1.067	N/A
22959	83/ 1/12	NW	.101	.600	.001	BDL	.061	.134	.155	.006	BDL	BDL	.722	N/A
22959	83/ 2/23	NW	.034	.368	BDL	BDL	.034	.061	.050	BDL	BDL	.015	.217	N/A
22959	83/ 3/ 1	NE	.349	2.040	.002	BDL	.239	1.070	.468	.058	.008	.167	1.934	N/A
22959	83/ 3/31	NE	.223	1.630	.001	BDL	.013	.419	.356	.018	.004	.034	1.008	N/A
22959	83/ 4/30	S	.182	1.080	BDL	BDL	.012	.338	.266	.013	BDL	.039	1.128	N/A
22959	83/ 5/ 6	S	.319	2.080	BDL	BDL	.066	.548	.484	.019	BDL	.029	2.101	N/A
22959	83/ 5/30	SW	.453	.397	BDL	BDL	.023	.444	.157	.010	BDL	.011	3.260	N/A
22959	83/ 6/ 5	SW	.249	.678	.001	.009	.015	.412	.189	.014	BDL	.046	1.292	N/A
22959	83/ 6/11	S	.457	2.710	.001	BDL	.130	.673	.466	.023	BDL	.074	3.260	N/A
22959	83/ 6/29	NE	.158	1.570	.001	BDL	.009	.330	.303	.015	.003	.030	.941	N/A
22959	83/ 7/11	SW	.145	1.280	.001	.001	.035	.441	.361	.018	BDL	.037	1.800	N/A
22959	83/ 7/28	SSW	.102	.686	BDL	BDL	.042	.229	.201	.008	BDL	.046	1.100	N/A
22959	83/ 8/ 4	SW	.384	.947	BDL	.002	.022	.233	.129	.008	.003	.032	1.000	N/A
22959	83/ 8/16	SSW	.610	1.196	.001	.005	.063	.645	.290	.017	.004	.063	2.300	N/A
22959	83/ 8/22	NW	.158	.766	BDL	BDL	.077	.221	.178	.009	BDL	.025	.900	N/A
22959	83/ 9/ 9	SW	.306	.942	.001	.001	.007	.546	.277	.022	.003	.049	2.600	N/A
22959	83/ 9/21	WNW	.094	.270	BDL	BDL	.009	.099	.069	.003	BDL	.006	.400	N/A
22959	83/10/ 3	SW	.442	1.216	.001	.002	.006	.498	.318	.028	BDL	.048	4.200	N/A
22959	83/10/ 9	NE	.076	.344	BDL	.001	.004	.202	.079	.009	BDL	.010	.300	N/A
22959	83/10/21	NE	.194	1.779	BDL	.002	.004	.342	.364	.013	.004	.056	1.000	N/A
	ARITH MEAN		.248	1.084	.001	.003	.048	.400	.249	.015	.004	.042	1.549	N/A
	STD DEV		.150	.640	.000	.003	.053	.284	.126	.012	.002	.034	1.041	N/A
	GEO MEAN		.200	.886	.001	.002	.029	.329	.211	.011	.004	.031	1.209	N/A
	MAXIMUM		.610	2.710	.002	.009	.239	1.070	.468	.058	.008	.167	4.200	N/A
	MINIMUM		.094	.270	.001	.001	.004	.061	.050	.000	.003	.004	.217	N/A
	# OF SAMPLE		21	21	11	9	21	21	21	21	7	21	21	0

1983 Particulate Trace Metal Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	AL	CA	CD	CR	CU	FE	MG	MN	NI	PB	SI	ZN
22961	83/ 1/ 6	SW	.208	2.300	.001	BDL	.087	.462	.433	.032	.004	.087	1.514	N/A
22961	83/ 1/12	NW	.247	2.320	BDL	BDL	.020	.365	.632	.037	BDL	.013	.932	N/A
22961	83/ 2/23	NW	.061	.937	BDL	BDL	.025	.354	.214	.022	BDL	.015	.303	N/A
22961	83/ 3/ 1	NE	.298	3.370	.001	BDL	.046	1.060	.756	.050	BDL	.150	2.128	N/A
22961	83/ 3/31	NE	.174	1.990	.001	BDL	.008	.415	.611	.025	BDL	.030	1.139	N/A
22961	83/ 4/30	S	.147	1.040	.001	BDL	.058	.729	.273	.038	BDL	.049	.868	N/A
22961	83/ 5/ 6	S	.245	2.200	BDL	BDL	.136	.558	.512	.031	.004	.050	2.138	N/A
22961	83/ 5/30	SW	.711	4.080	.001	BDL	.025	1.900	.872	.136	BDL	.029	4.058	N/A
22961	83/ 6/ 5	SW	.311	3.910	.002	BDL	.050	2.680	.926	.180	.004	.084	1.970	N/A
22961	83/ 6/11	S	.554	5.190	.001	BDL	.087	1.900	.942	.101	BDL	.100	3.761	N/A
22961	83/ 6/29	NE	.168	1.560	BDL	BDL	.012	.520	.405	.034	BDL	.021	.959	N/A
22961	83/ 7/11	SW	.253	6.002	.001	.004	.064	2.140	1.475	.147	BDL	.051	2.100	N/A
22961	83/ 7/28	SSW	.178	2.256	.001	.001	.067	1.225	.609	.055	BDL	.041	1.300	N/A
22961	83/ 8/ 4	SW	.196	3.067	BDL	.004	.082	1.135	.682	.103	BDL	.046	1.300	N/A
22961	83/ 8/16	SSW	.327	2.544	.001	.003	.064	1.009	.617	.050	BDL	.069	2.300	N/A
22961	83/ 8/22	NW	.138	1.330	BDL	.002	.014	.307	.388	.033	BDL	.033	.900	N/A
22961	83/ 9/ 9	SW	.396	5.101	.001	.005	.014	2.886	1.125	.150	BDL	.072	3.700	N/A
22961	83/ 9/21	WNW	.127	1.704	BDL	BDL	.005	.992	.571	.026	BDL	.018	.700	N/A
22961	83/10/ 3	SW	.551	6.406	.001	.008	.013	3.459	1.287	.215	.013	.078	5.300	N/A
22961	83/10/ 9	NE	.037	.270	BDL	BDL	BDL	.129	.084	.006	BDL	.011	.200	N/A
22961	83/10/21	NE	.198	1.495	BDL	.001	.004	.869	.606	.020	.005	.036	1.500	N/A
	ARITH MEAN		.268	2.946	.001	.003	.040	1.146	.665	.071	.006	.053	1.860	N/A
	STD DEV		.165	1.821	.000	.002	.034	.948	.383	.059	.004	.034	1.302	N/A
	GEO MEAN		.215	2.340	.001	.003	.026	.806	.568	.050	.005	.042	1.424	N/A
	MAXIMUM		.711	6.406	.002	.008	.136	3.459	1.475	.215	.013	.150	5.300	N/A
	MINIMUM		.037	.270	.001	.001	.004	.129	.084	.006	.004	.011	.200	N/A
	# OF SAMPLE		21	21	12	9	21	21	21	21	5	21	21	0

N/A - data not available
BDL - below detection limit

1983 Particulate Trace Metal Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	AL	CA	CD	CR	CU	FE	MG	MN	NI	PB	SI	ZN
22963	83/ 1/ 6	SW	.218	1.950	.001	BDL	.023	.542	.335	.031	.004	.087	1.240	N/A
22963	83/ 1/12	NW	.194	.729	BDL	BDL	.009	.187	.244	.009	BDL	BDL	1.008	N/A
22963	83/ 2/23	NW	.084	.361	BDL	BDL	.006	.097	.074	.005	BDL	.007	.224	N/A
22963	83/ 3/ 1	NE	.302	3.560	.001	BDL	.020	1.430	.681	.068	.006	.190	1.892	N/A
22963	83/ 3/31	NE	.170	1.210	BDL	BDL	BDL	.321	.380	.017	BDL	.026	1.021	N/A
22963	83/ 4/30	S	.135	.572	.001	BDL	.006	.328	.170	.014	.006	.031	.792	N/A
22963	83/ 5/ 6	S	.390	6.250	.001	BDL	.043	2.150	1.080	.112	.008	.091	2.997	N/A
22963	83/ 5/30	SW	.638	1.310	BDL	BDL	.006	.693	.318	.019	BDL	.021	4.337	N/A
22963	83/ 6/ 5	SW	.177	1.430	BDL	BDL	.006	.449	.286	.031	BDL	.057	1.179	N/A
22963	83/ 6/11	S	.711	8.420	.001	BDL	.055	2.390	1.410	.135	BDL	.109	6.640	N/A
22963	83/ 6/29	NE	.146	.987	BDL	BDL	.008	.241	.301	.014	BDL	.016	.944	N/A
22963	83/ 7/11	SW	.136	4.022	BDL	BDL	.034	.489	.704	.021	BDL	.035	1.800	N/A
22963	83/ 7/23	SSW	.248	2.816	.001	.003	.027	1.147	.524	.043	BDL	.042	1.400	N/A
22963	83/ 8/ 4	SW	.110	.858	BDL	BDL	.024	.281	.195	.015	BDL	.028	1.000	N/A
22963	83/ 8/16	SSW	.318	6.008	BDL	.003	.056	1.313	1.246	.109	BDL	.022	3.600	N/A
22963	83/ 8/22	NW	.136	.820	BDL	BDL	.036	.285	.246	.018	BDL	.022	1.100	N/A
22963	83/ 9/21	WNW	.090	.335	BDL	BDL	.018	.237	.128	.018	BDL	.011	.500	N/A
22963	83/10/ 3	SW	.891	4.967	.001	.001	.012	.784	.622	.037	BDL	.069	4.300	N/A
22963	83/10/ 9	NE	BDL	.171	BDL	BDL	.002	.051	.065	.004	BDL	.014	.100	N/A
ARITH MEAN			.239	2.447	.001	.002	.021	.706	.469	.038	.006	.046	1.895	N/A
STD DEV			.181	2.389	.000	.001	.017	.661	.379	.038	.001	.045	1.663	N/A
GEO MEAN			.164	1.502	.001	.002	.014	.455	.338	.024	.006	.030	1.265	N/A
MAXIMUM			.711	8.420	.001	.003	.056	2.390	1.410	.135	.008	.190	6.640	N/A
MINIMUM			.005	.171	.001	.001	.002	.051	.065	.004	.004	.004	.100	N/A
# OF SAMPLE			19	19	7	3	19	19	19	19	4	19	19	0

N/A - data not available
BDL - below detection limit

1983 Particulate Ions Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CL-	F-	NH4	NO3	P	SO4
22904	83/ 1/ 6	SW	.2500	.0100	17.8000	4.5000	BDL	8.4000
22904	83/ 1/12	NW	.3700	.0100	1.0000	.4000	BDL	.6000
22904	83/ 2/23	NW	.1600	.0100	5.0000	1.5000	BDL	2.4000
22904	83/ 3/ 1	NE	1.0500	.0200	15.2000	10.6000	BDL	9.9000
22904	83/ 3/31	NE	.1800	.0100	.1000	BDL	BDL	.2000
22904	83/ 5/ 6	S	.1400	.0100	4.0000	3.1000	BDL	2.9000
22904	83/ 6/11	S	.1100	.0100	18.4000	7.0000	BDL	11.0000
22904	83/ 6/29	NE	.2600	.0100	3.2000	2.9000	BDL	1.0000
22904	83/ 7/11	SW	1.2000	BDL	1.4000	2.6000	BDL	4.9000
22904	83/ 7/23	SSW	1.3000	BDL	1.5000	5.0000	BDL	3.9000
22904	83/ 8/ 4	SW	1.7000	BDL	2.8000	1.3000	BDL	9.7000
22904	83/ 8/22	NW	.6000	BDL	3.1000	2.6000	BDL	11.5000
22904	83/ 9/21	WNW	.4000	BDL	.8000	1.1000	BDL	2.3000
22904	83/10/ 3	SW	.7000	BDL	4.2000	4.0000	BDL	17.1000
22904	83/10/ 9	NE	.7000	BDL	.5000	.8000	BDL	1.0000
22904	83/10/21	NE	1.0000	BDL	1.0000	5.0000	BDL	1.8000
ARITH MEAN			.6325	.0113	4.6875	3.2781	BDL	5.5375
STD DEV			.4729	.0033	5.4159	2.6595	BDL	4.8863
GEO MEAN			.4560	.0109	2.3213	2.0076	BDL	3.1905
MAXIMUM			1.7000	.0200	17.8000	10.6000	BDL	17.1000
MINIMUM			.1100	.0100	.1000	.0500	BDL	.2000
# OF SAMPLE			16	8	16	16	16	16

1983 Particulate Ions Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CL-	F-	NH4	NO3	P	SO4
22951	83/ 1/ 6	SW	.2600	.0100	13.4000	6.8000	BDL	7.7000
22951	83/ 1/12	NW	.4500	.0100	.1000	.4000	BDL	1.0000
22951	83/ 2/23	NW	BDL	.0100	3.6000	.9000	BDL	2.1000
22951	83/ 3/ 1	NE	1.3000	.0700	15.0000	9.9000	BDL	20.5000
22951	83/ 3/31	NE	.3300	.0100	4.0000	1.9000	BDL	2.6000
22951	83/ 4/30	S	.1800	.0100	8.8000	4.0000	BDL	5.5000
22951	83/ 5/ 6	S	.2300	.0100	6.0000	4.5000	BDL	3.6000
22951	83/ 5/30	SW	.0400	.0100	6.2000	2.3000	BDL	3.5000
22951	83/ 6/ 5	SW	.0300	.0100	15.2000	5.0000	BDL	8.6000
22951	83/ 6/11	S	.2100	.0200	17.0000	7.4000	BDL	12.1000
22951	83/ 6/29	NE	.1200	.0100	2.6000	1.8000	BDL	.9000
22951	83/ 7/11	SW	1.3000	BDL	1.4000	1.7000	BDL	5.2000
22951	83/ 7/23	SSW	1.3000	BDL	1.5000	3.4000	BDL	4.5000
22951	83/ 8/ 4	SW	.5000	BDL	4.6000	3.8000	BDL	15.9000
22951	83/ 8/16	SSW	.6000	BDL	5.6000	5.7000	BDL	23.6000
22951	83/ 8/22	NW	.5000	BDL	2.8000	2.0000	BDL	10.0000
22951	83/ 9/ 9	SW	.4000	BDL	4.5000	6.8000	BDL	11.8000
22951	83/ 9/21	WNW	.4000	BDL	.5000	.6000	BDL	1.3000
22951	83/10/ 3	SW	.8000	BDL	4.6000	3.8000	BDL	15.6000
22951	83/10/ 9	NE	.9000	BDL	.4000	.7000	BDL	1.4000
22951	83/10/21	NE	1.0000	BDL	1.2000	4.2000	BDL	1.6000
ARITH MEAN			.5169	.0164	5.6667	3.6952	BDL	7.5714
STD DEV			.4149	.0172	5.0976	2.4992	BDL	6.5841
GEO MEAN			.2981	.0127	3.2254	2.7305	BDL	4.8605
MAXIMUM			1.3000	.0700	17.0000	9.9000	BDL	23.6000
MINIMUM			.0050	.0100	.1000	.4000	BDL	.9000
# OF SAMPLE			21	11	21	21	21	21

BDL - below detection limit

1983 Particulate Ions Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CL-	F-	NH4	NO3	P	SO4
22952	83/ 1/ 6	SW	.2400	.0100	12.6000	5.8000	BDL	7.7000
22952	83/ 1/12	NW	.3500	.0100	1.6000	.1000	BDL	1.3000
22952	83/ 2/23	NW	.0700	.0100	5.0000	1.7000	BDL	2.6000
22952	83/ 3/31	NE	.3000	.0100	4.0000	2.0000	BDL	2.9000
22952	83/ 4/30	S	.1300	.0100	8.0000	3.0000	BDL	4.6000
22952	83/ 5/ 6	S	.1100	.0100	3.8000	2.7000	BDL	3.1000
22952	83/ 5/30	SW	.1400	.0100	5.2000	1.7000	BDL	3.3000
22952	83/ 6/ 5	SW	.0200	.0100	12.6000	2.6000	BDL	9.3000
22952	83/ 6/11	S	.1000	.0100	10.6000	6.5000	BDL	7.7000
22952	83/ 6/29	NE	.1300	.0100	3.8000	2.0000	BDL	2.0000
22952	83/ 7/11	SW	1.1000	BDL	.9000	1.8000	BDL	3.8000
22952	83/ 7/23	SSW	1.2000	BDL	1.0000	3.1000	BDL	3.1000
22952	83/ 8/ 4	SW	.4000	BDL	4.3000	.4000	BDL	16.6000
22952	83/ 8/22	NW	.6000	BDL	2.9000	1.8000	BDL	10.2000
22952	83/ 9/ 9	SW	.2000	BDL	3.7000	.8000	BDL	13.7000
22952	83/ 9/21	WNW	.3000	BDL	.9000	1.1000	BDL	2.8000
22952	83/10/ 3	SW	.7000	BDL	3.9000	1.0000	BDL	14.5000
22952	83/10/ 9	NE	.7000	BDL	.4000	.3000	BDL	1.2000
22952	83/10/21	NE	1.1000	BDL	1.2000	3.8000	BDL	1.5000
ARITH MEAN			.4153	.0100	4.5474	2.2210	BDL	5.8895
STD DEV			.3674	.0000	3.7027	1.6644	BDL	4.7110
GEO MEAN			.2628	.0100	3.1071	1.5410	BDL	4.2849
MAXIMUM			1.2000	.0100	12.6000	6.5000	BDL	16.6000
MINIMUM			.0200	.0100	.4000	.1000	BDL	1.2000
# OF SAMPLE			19	10	19	19	19	19

1983 Particulate Ions Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CL-	F-	NH4	NO3	P	SO4
22953	83/ 1/ 6	SW	.2100	.0100	13.0000	4.3000	BDL	7.4000
22953	83/ 1/12	NW	.4900	.0100	.1000	.1000	BDL	.9000
22953	83/ 2/23	NW	.1200	.0100	4.2000	1.3000	BDL	2.4000
22953	83/ 3/ 1	NE	.8700	.0200	13.4000	8.1000	BDL	11.4000
22953	83/ 3/31	NE	.4100	.0300	3.4000	1.6000	BDL	2.9000
22953	83/ 4/30	S	.1800	.0100	7.0000	3.6000	BDL	4.9000
22953	83/ 5/ 6	S	.2400	.0300	3.0000	2.7000	BDL	3.0000
22953	83/ 5/30	SW	.1400	.0100	4.0000	1.3000	BDL	3.0000
22953	83/ 6/ 5	SW	.0800	.0100	11.6000	1.3000	BDL	10.1000
22953	83/ 6/11	S	.1300	.0100	10.0000	5.8000	BDL	9.6000
22953	83/ 6/29	NE	.3500	.0400	1.0000	1.9000	BDL	1.4000
22953	83/ 7/11	SW	1.4000	BDL	1.2000	1.5000	BDL	3.7000
22953	83/ 7/23	SSW	1.4000	BDL	.9000	2.2000	BDL	2.6000
22953	83/ 8/ 4	SW	.7000	BDL	4.1000	1.6000	BDL	14.6000
22953	83/ 8/16	SSW	.6000	BDL	4.5000	.1000	BDL	21.2000
22953	83/ 8/22	NW	1.1000	BDL	2.7000	1.5000	BDL	11.2000
22953	83/ 9/ 9	SW	.4000	BDL	3.5000	3.0000	BDL	11.9000
22953	83/10/ 3	SW	.9000	BDL	4.1000	2.3000	BDL	14.3000
22953	83/10/ 9	NE	1.0000	BDL	.4000	.5000	BDL	1.0000
22953	83/10/21	NE	1.1000	BDL	.9000	5.1000	BDL	2.3000
ARITH MEAN			.5910	.0173	4.6500	2.4900	BDL	6.9900
STD DEV			.4274	.0105	4.0713	1.9710	BDL	5.5746
GEO MEAN			.4237	.0148	2.7633	1.6334	BDL	4.7950
MAXIMUM			1.4000	.0400	13.4000	8.1000	BDL	21.2000
MINIMUM			.0800	.0100	.1000	.1000	BDL	.9000
# OF SAMPLE			20	11	20	20	20	20

BDL - below detection limit

1983 Particulate Ions Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CL-	F-	NH4	NO3	P	SO4
22955	83/ 1/ 6	SW	.1700	.0100	12.4000	5.8000	BDL	7.9000
22955	83/ 1/12	NW	.3700	.0100	.1000	.4000	BDL	1.3000
22955	83/ 2/23	NW	.0200	.0100	3.0000	.8000	BDL	1.7000
22955	83/ 3/ 1	NE	.7800	.0300	14.8000	9.6000	BDL	8.4000
22955	83/ 3/31	NE	.3500	.0200	4.0000	1.6000	BDL	2.4000
22955	83/ 4/30	S	.1400	.0100	6.8000	2.7000	BDL	3.9000
22955	83/ 5/ 6	S	.1000	.0100	4.2000	2.5000	BDL	3.1000
22955	83/ 5/30	SW	.1100	.0100	4.7000	1.5000	BDL	3.1000
22955	83/ 6/ 5	SW	.0300	.0100	13.2000	3.2000	BDL	8.8000
22955	83/ 6/11	S	.1900	.0100	15.2000	6.8000	BDL	10.3000
22955	83/ 6/29	NE	.2800	.0100	2.6000	1.3000	BDL	1.1000
22955	83/ 7/11	SW	1.4000	BDL	1.9000	3.6000	BDL	5.3000
22955	83/ 7/23	SSW	1.4000	BDL	1.3000	2.8000	BDL	3.4000
22955	83/ 8/ 4	SW	.7000	BDL	4.2000	2.7000	BDL	13.4000
22955	83/ 8/16	SSW	.6000	BDL	5.0000	.1000	BDL	20.6000
22955	83/ 8/22	NW	.7000	BDL	3.2000	1.8000	BDL	10.8000
22955	83/ 9/ 9	SW	.3000	BDL	3.9000	3.1000	BDL	12.6000
22955	83/ 9/21	WNW	.4000	BDL	.6000	.7000	BDL	1.4000
22955	83/10/ 3	SW	.8000	BDL	4.1000	1.7000	BDL	17.4000
22955	83/10/ 9	NE	1.0000	BDL	.4000	.5000	BDL	1.0000
22955	83/10/21	NE	1.1000	BDL	1.1000	4.1000	BDL	1.7000
ARITH MEAN			.5210	.0127	5.0809	2.7286	BDL	6.6476
STD DEV			.4206	.0062	4.6065	2.2695	BDL	5.6148
GEO MEAN			.3236	.0118	3.0046	1.8238	BDL	4.4262
MAXIMUM			1.4000	.0300	15.2000	9.6000	BDL	20.6000
MINIMUM			.0200	.0100	.1000	.1000	BDL	1.0000
# OF SAMPLE			21	11	21	21	21	21

1983 Particulate Ions Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CL-	F-	NH4	NO3	P	SO4
22957	83/ 1/ 6	SW	.2600	.0100	14.0000	4.3000	BDL	9.3000
22957	83/ 1/12	NW	.5200	.0100	1.2000	BDL	BDL	1.4000
22957	83/ 2/23	NW	.1100	.0100	3.8000	.9000	BDL	2.2000
22957	83/ 3/ 1	NE	.9900	.0300	14.2000	9.1000	BDL	8.7000
22957	83/ 4/30	S	.1900	.0100	8.8000	3.3000	BDL	4.9000
22957	83/ 5/ 6	S	.1500	.0100	5.0000	2.7000	BDL	3.0000
22957	83/ 5/30	SW	.3300	.0100	5.4000	1.7000	BDL	3.3000
22957	83/ 6/ 5	SW	.1000	.0100	15.6000	5.0000	BDL	10.7000
22957	83/ 6/11	S	.1600	.0200	16.0000	6.8000	BDL	11.7000
22957	83/ 6/29	NE	.1900	.0100	2.6000	1.0000	BDL	.9000
22957	83/ 7/11	SW	1.4000	BDL	1.6000	2.9000	BDL	5.7000
22957	83/ 7/23	SSW	.4000	BDL	1.3000	2.8000	BDL	3.7000
22957	83/ 8/ 4	SW	.9000	BDL	4.5000	3.0000	BDL	14.2000
22957	83/ 8/16	SSW	.7000	BDL	4.6000	3.1000	BDL	20.0000
22957	83/ 8/22	NW	.7000	BDL	3.3000	2.0000	BDL	10.4000
22957	83/ 9/ 9	SW	.5000	BDL	3.9000	7.0000	BDL	14.3000
22957	83/ 9/21	WNW	.4000	BDL	.4000	.7000	BDL	1.3000
22957	83/10/ 3	SW	1.1000	BDL	4.4000	4.2000	BDL	16.7000
22957	83/10/ 9	NE	.9000	BDL	.4000	.4000	BDL	.9000
22957	83/10/21	NE	1.2000	BDL	1.2000	5.0000	BDL	2.0000
ARITH MEAN			.5600	.0130	5.6100	3.2975	BDL	7.2650
STD DEV			.3923	.0064	5.0729	2.3356	BDL	5.7242
GEO MEAN			.4165	.0120	3.4737	2.1755	BDL	4.8283
MAXIMUM			1.4000	.0300	16.0000	9.1000	BDL	20.0000
MINIMUM			.1000	.0100	.4000	.0500	BDL	.9000
# OF SAMPLE			20	10	20	20	20	20

BDL - below detection limit

1983 Particulate Ions Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CL-	F-	NH4	NO3	P	SO4
22959	83/ 1/ 6	SW	.1500	.0100	13.8000	3.4000	BDL	10.9000
22959	83/ 1/12	NW	.4500	.0100	.1000	.3000	BDL	1.4000
22959	83/ 2/23	NW	.1200	.0100	3.4000	.4000	BDL	2.4000
22959	83/ 3/ 1	NE	.6400	.0100	11.0000	7.6000	BDL	11.5000
22959	83/ 3/31	NE	.3700	.0200	4.4000	2.0000	BDL	3.1000
22959	83/ 4/30	S	.1300	.0100	7.4000	3.4000	BDL	5.2000
22959	83/ 5/ 6	S	.1700	.0100	2.6000	1.9000	BDL	2.7000
22959	83/ 5/30	SW	.0900	.0100	3.4000	.6000	BDL	2.7000
22959	83/ 6/ 5	SW	.0800	.0100	13.6000	2.7000	BDL	10.1000
22959	83/ 6/11	S	.2000	.0100	12.4000	6.8000	BDL	11.7000
22959	83/ 6/29	NE	.3900	.0100	3.8000	3.4000	BDL	1.9000
22959	83/ 7/11	SW	.5000	BDL	1.4000	2.7000	BDL	5.6000
22959	83/ 7/23	SSW	.5000	BDL	1.8000	2.4000	BDL	5.0000
22959	83/ 8/ 4	SW	.7000	BDL	3.3000	1.8000	BDL	11.2000
22959	83/ 8/16	SSW	.7000	BDL	5.4000	.6000	BDL	28.1000
22959	83/ 8/22	NW	.6000	BDL	3.1000	1.6000	BDL	11.7000
22959	83/ 9/ 9	SW	.4000	BDL	4.0000	4.1000	BDL	15.5000
22959	83/ 9/21	WNW	.6000	BDL	.6000	1.1000	BDL	1.9000
22959	83/10/ 3	SW	1.0000	BDL	4.4000	2.2000	BDL	18.4000
22959	83/10/ 9	NE	.8000	BDL	.5000	.7000	BDL	1.6000
22959	83/10/21	NE	1.2000	BDL	1.1000	5.0000	BDL	2.7000
ARITH MEAN			.4662	.0109	4.8333	2.6048	BDL	7.8714
STD DEV			.3019	.0029	4.1979	1.9429	BDL	6.7328
GEO MEAN			.3570	.0107	2.9565	1.8818	BDL	5.4286
MAXIMUM			1.2000	.0200	13.8000	7.6000	BDL	28.1000
MINIMUM			.0800	.0100	.1000	.3000	BDL	1.4000
# OF SAMPLE			21	11	21	21	21	21

1983 Particulate Ions Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CL-	F-	NH4	NO3	P	SO4
22961	83/ 1/ 6	SW	.2900	.0200	9.6000	6.0000	BDL	7.8000
22961	83/ 1/12	NW	.7100	.0200	.1000	.9000	BDL	1.6000
22961	83/ 2/23	NW	.1200	.0200	3.4000	1.4000	BDL	2.2000
22961	83/ 3/ 1	NE	.9300	.0400	13.2000	8.7000	BDL	10.3000
22961	83/ 3/31	NE	.4100	.0300	4.0000	2.0000	BDL	2.7000
22961	83/ 4/30	S	.1700	.0400	7.4000	3.8000	BDL	5.0000
22961	83/ 5/ 6	S	.3300	.0300	3.8000	3.3000	BDL	3.3000
22961	83/ 5/30	SW	.2200	.1200	3.6000	2.5000	BDL	4.3000
22961	83/ 6/ 5	SW	.3200	.2700	11.4000	7.5000	BDL	13.7000
22961	83/ 6/11	S	.7300	.0800	12.0000	7.1000	BDL	11.2000
22961	83/ 6/29	NE	.8100	.0500	2.8000	2.3000	BDL	1.7000
22961	83/ 7/11	SW	.8000	BDL	1.4000	4.0000	BDL	6.3000
22961	83/ 7/23	SSW	.9000	BDL	1.3000	3.6000	BDL	4.5000
22961	83/ 8/ 4	SW	.8000	BDL	2.9000	4.4000	BDL	14.1000
22961	83/ 8/16	SSW	.8000	BDL	5.0000	3.6000	BDL	22.3000
22961	83/ 8/22	NW	.8000	BDL	2.9000	2.4000	BDL	10.8000
22961	83/ 9/ 9	SW	.8000	BDL	3.9000	10.1000	BDL	15.4000
22961	83/ 9/21	WNW	.6000	BDL	.5000	1.1000	BDL	2.2000
22961	83/10/ 3	SW	1.8000	.1000	3.6000	6.5000	BDL	19.2000
22961	83/10/ 9	NE	1.3000	BDL	.6000	.5000	BDL	1.9000
22961	83/10/21	NE	1.6000	BDL	1.5000	5.7000	BDL	4.6000
ARITH MEAN			.7257	.0683	4.5190	4.1619	BDL	7.8619
STD DEV			.4317	.0685	3.8146	2.6140	BDL	6.0242
GEO MEAN			.5884	.0480	2.8368	3.2520	BDL	5.7094
MAXIMUM			1.8000	.2700	13.2000	10.1000	BDL	22.3000
MINIMUM			.1200	.0200	.1000	.5000	BDL	1.6000
# OF SAMPLE			21	12	21	21	21	21

BDL - below detection limit

1983 Particulate Ions Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CL-	F-	NH4	NO3	P	SO4
22963	83/ 1/ 6	SW	1.0500	.0400	13.6000	7.1000	BDL	9.5000
22963	83/ 1/12	NW	1.4600	.0100	1.3000	1.1000	BDL	1.2000
22963	83/ 2/23	NW	.2500	.0100	4.4000	2.2000	BDL	2.5000
22963	83/ 3/ 1	NE	2.6500	.0500	16.6000	10.0000	BDL	13.1000
22963	83/ 3/31	NE	.9500	.0100	4.4000	2.4000	BDL	2.8000
22963	83/ 4/30	S	.8200	.0100	8.2000	4.4000	BDL	5.0000
22963	83/ 5/ 6	S	1.3900	.0100	3.2000	4.2000	BDL	3.9000
22963	83/ 5/30	SW	.5300	.0100	5.1000	2.7000	BDL	3.6000
22963	83/ 6/ 5	SW	.1600	.0100	14.2000	5.5000	BDL	12.3000
22963	83/ 6/11	S	.5000	.0100	10.2000	9.3000	BDL	12.8000
22963	83/ 6/29	NE	.3300	.0700	2.6000	2.6000	BDL	1.1000
22963	83/ 7/11	SW	.8000	BDL	1.2000	2.5000	BDL	4.2000
22963	83/ 7/23	SSW	.8000	BDL	1.1000	3.2000	BDL	4.3000
22963	83/ 8/ 4	SW	.9000	BDL	4.5000	3.1000	BDL	15.3000
22963	83/ 8/16	SSW	.9000	BDL	4.4000	5.8000	BDL	23.7000
22963	83/ 8/22	NW	1.0000	BDL	3.6000	2.3000	BDL	11.9000
22963	83/ 9/21	WNW	.7000	BDL	.7000	.8000	BDL	2.3000
22963	83/10/ 3	SW	1.3000	BDL	3.8000	4.1000	BDL	18.7000
22963	83/10/ 9	NE	1.4000	BDL	.4000	.3000	BDL	1.1000
ARITH MEAN			.9416	.0218	5.4474	3.8737	BDL	7.8579
STD DEV			.5471	.0204	4.7204	2.5902	BDL	6.5027
GEO MEAN			.7854	.0157	3.5513	2.9583	BDL	5.2422
MAXIMUM			2.6500	.0700	16.6000	10.0000	BDL	23.7000
MINIMUM			.1600	.0100	.4000	.3000	BDL	1.1000
# OF SAMPLE			19	11	19	19	19	19

1983 Carbon Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CT	CF	RATIO (CF/CT)
22904	83/ 1/ 6	SW	6.80	.80	.118
22904	83/ 1/12	NW	1.50	.30	.200
22904	83/ 2/23	NW	2.00	.20	.100
22904	83/ 3/ 1	NE	10.80	2.50	.231
22904	83/ 3/31	NE	4.00	.90	.225
22904	83/ 4/30	S	3.50	.70	.200
22904	83/ 5/ 6	S	4.50	1.00	.222
22904	83/ 6/ 5	SW	8.20	4.00	.488
22904	83/ 6/11	S	7.00	2.10	.300
22904	83/ 6/29	NE	4.40	1.00	.227
22904	83/ 7/11	SW	6.70	.80	.119
22904	83/ 7/23	SSW	6.20	.60	.097
22904	83/ 8/ 4	SW	6.80	1.60	.235
22904	83/ 8/16	SSW	9.90	1.70	.172
22904	83/ 8/22	NW	6.30	.70	.111
22904	83/ 9/21	WNW	3.30	1.60	.485
22904	83/10/ 3	SW	12.00	1.80	.150
22904	83/10/ 9	NE	2.30	.80	.348
22904	83/10/21	NE	4.60	2.60	.565
	ARITH MEAN		5.83	1.35	
	STD DEV		2.86	.92	
	GEO MEAN		5.08	1.07	
	MAXIMUM		12.00	4.00	
	MINIMUM		1.50	.20	
	# OF SAMPLE		19	19	

1983 Carbon Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CT	CF	RATIO (CF/CT)
22951	83/ 1/ 6	SW	7.10	1.20	.169
22951	83/ 1/12	NW	2.60	.20	.077
22951	83/ 2/23	NW	1.70	1.30	.765
22951	83/ 3/ 1	NE	14.70	1.00	.068
22951	83/ 3/31	NE	3.40	.40	.118
22951	83/ 4/30	S	2.90	.50	.172
22951	83/ 5/ 6	S	5.60	.30	.054
22951	83/ 5/30	SW	5.30	.20	.038
22951	83/ 6/ 5	SW	5.30	.70	.132
22951	83/ 6/29	NE	5.50	.50	.091
22951	83/ 7/11	SW	7.30	1.00	.137
22951	83/ 7/23	SSW	7.20	.90	.125
22951	83/ 8/ 4	SW	7.60	1.90	.250
22951	83/ 8/16	SSW	11.30	4.90	.434
22951	83/ 8/22	NW	6.90	1.80	.261
22951	83/ 9/ 9	SW	9.10	1.50	.165
22951	83/ 9/21	WNW	2.60	.60	.231
22951	83/10/ 3	SW	12.70	2.20	.173
22951	83/10/ 9	NE	2.90	1.30	.448
22951	83/10/21	NE	5.10	1.00	.196
	ARITH MEAN		6.34	1.17	
	STD DEV		3.42	1.02	
	GEO MEAN		5.46	.86	
	MAXIMUM		14.70	4.90	
	MINIMUM		1.70	.20	
	# OF SAMPLE		20	20	

BDL - below detection limit

1983 Carbon Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CT	CF	RATIO (CF/CT)
22952	83/ 1/ 6	SW	7.20	.30	.042
22952	83/ 1/12	NW	3.90	.40	.103
22952	83/ 2/23	NW	4.00	1.20	.300
22952	83/ 4/30	S	3.30	.80	.242
22952	83/ 5/ 6	S	4.80	.40	.083
22952	83/ 5/30	SW	3.90	.30	.077
22952	83/ 6/ 5	SW	6.10	.80	.131
22952	83/ 6/11	S	8.00	.80	.100
22952	83/ 6/29	NE	6.80	.50	.074
22952	83/ 7/11	SW	4.50	.40	.089
22952	83/ 7/23	SSW	6.00	.80	.133
22952	83/ 8/ 4	SW	7.10	1.90	.268
22952	83/ 8/16	SSW	9.00	1.20	.133
22952	83/ 8/22	NW	6.40	.60	.094
22952	83/ 9/ 9	SW	9.30	1.50	.161
22952	83/ 9/21	WNW	3.50	1.30	.371
22952	83/10/ 3	SW	9.60	.90	.094
22952	83/10/ 9	NE	2.80	.40	.143
22952	83/10/21	NE	5.10	1.00	.196
	ARITH MEAN		5.86	.82	
	STD DEV		2.07	.43	
	GEO MEAN		5.49	.71	
	MAXIMUM		9.60	1.90	
	MINIMUM		2.80	.30	
	# OF SAMPLE		19	19	

1983 Carbon Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CT	CF	RATIO (CF/CT)
22953	83/ 1/ 6	SW	6.90	1.20	.174
22953	83/ 1/12	NW	1.50	.60	.400
22953	83/ 2/23	NW	1.50	.20	.133
22953	83/ 3/ 1	NE	10.40	1.90	.183
22953	83/ 3/31	NE	4.30	.80	.186
22953	83/ 4/30	S	3.70	.80	.216
22953	83/ 5/ 6	S	5.10	1.70	.333
22953	83/ 5/30	SW	4.80	.30	.063
22953	83/ 6/ 5	SW	6.40	.80	.125
22953	83/ 6/11	S	7.90	1.30	.165
22953	83/ 6/29	NE	7.80	1.40	.179
22953	83/ 7/11	SW	6.20	.90	.145
22953	83/ 7/23	SSW	5.20	.40	.077
22953	83/ 8/ 4	SW	6.30	.70	.111
22953	83/ 8/16	SSW	9.20	.70	.076
22953	83/ 8/22	NW	6.80	.20	.029
22953	83/ 9/ 9	SW	11.20	1.10	.098
22953	83/10/ 3	SW	10.10	.80	.079
22953	83/10/ 9	NE	2.80	1.20	.429
22953	83/10/21	NE	4.90	.90	.184
	ARITH MEAN		6.15	.89	
	STD DEV		2.69	.45	
	GEO MEAN		5.43	.76	
	MAXIMUM		11.20	1.90	
	MINIMUM		1.50	.20	
	# OF SAMPLE		20	20	

BDL - below detection limit

1983 Carbon Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CT	CF	RATIO (CF/CT)
22955	83/ 1/ 6	SW	6.20	2.50	.403
22955	83/ 1/12	NW	2.50	.60	.240
22955	83/ 3/ 1	NE	11.80	1.90	.161
22955	83/ 3/31	NE	4.70	1.10	.234
22955	83/ 4/30	S	2.90	.50	.172
22955	83/ 5/30	SW	4.60	.60	.130
22955	83/ 6/ 5	SW	5.90	1.00	.169
22955	83/ 6/11	S	7.50	.60	.080
22955	83/ 6/29	NE	6.30	.70	.111
22955	83/ 7/11	SW	5.80	.40	.069
22955	83/ 7/23	SSW	6.00	.20	.033
22955	83/ 8/ 4	SW	7.40	.60	.081
22955	83/ 8/16	SSW	9.80	.60	.061
22955	83/ 9/ 9	SW	11.40	.90	.079
22955	83/ 9/21	WNW	2.40	1.70	.708
22955	83/10/ 3	SW	9.60	1.40	.146
22955	83/10/ 9	NE	2.90	.80	.276
22955	83/10/21	NE	4.80	.10	.021

ARITH MEAN	6.25	.90
STD DEV	2.82	.60
GEO MEAN	5.60	.71
MAXIMUM	11.80	2.50
MINIMUM	2.40	.10
# OF SAMPLE	18	18

1983 Carbon Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CT	CF	RATIO (CF/CT)
22957	83/ 1/ 6	SW	7.50	.50	.067
22957	83/ 1/12	NW	2.70	.20	.074
22957	83/ 2/23	NW	2.10	.60	.286
22957	83/ 3/ 1	NE	12.00	1.90	.158
22957	83/ 4/30	S	3.40	.80	.235
22957	83/ 5/ 6	S	5.60	.80	.143
22957	83/ 5/30	SW	6.50	1.00	.154
22957	83/ 6/ 5	SW	8.20	1.20	.146
22957	83/ 6/11	S	10.70	.80	.075
22957	83/ 6/29	NE	4.90	.50	.102
22957	83/ 7/11	SW	10.20	1.10	.108
22957	83/ 7/23	SSW	7.00	.70	.100
22957	83/ 8/ 4	SW	7.70	.20	.026
22957	83/ 8/16	SSW	11.90	.80	.067
22957	83/ 8/22	NW	8.00	.10	.013
22957	83/ 9/21	WNW	2.90	.60	.207
22957	83/10/ 3	SW	14.80	.80	.056
22957	83/10/ 9	NE	2.80	BDL	BDL
22957	83/10/21	NE	5.20	.30	.058

ARITH MEAN	7.03	.68
STD DEV	3.47	.43
GEO MEAN	6.11	.40
MAXIMUM	14.80	1.90
MINIMUM	2.10	.00
# OF SAMPLE	19	19

BDL - below detection limit

1983 Carbon Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CT	CF	RATIO (CF/CT)
22959	83/ 1/ 6	SW	4.20	1.40	.333
22959	83/ 1/12	NW	2.10	1.00	.476
22959	83/ 2/23	NW	2.50	.90	.360
22959	83/ 3/ 1	NE	10.60	1.60	.151
22959	83/ 3/31	NE	5.50	1.90	.345
22959	83/ 5/30	SW	4.00	1.50	.375
22959	83/ 6/ 5	SW	9.40	1.70	.181
22959	83/ 6/11	S	8.90	1.00	.112
22959	83/ 6/29	NE	8.60	1.10	.128
22959	83/ 7/11	SW	9.50	.60	.063
22959	83/ 7/23	SSW	7.70	.10	.013
22959	83/ 8/ 4	SW	8.40	.40	.048
22959	83/ 8/16	SSW	10.70	1.00	.093
22959	83/ 8/22	NW	8.70	.30	.034
22959	83/ 9/ 9	SW	10.70	.50	.047
22959	83/ 9/21	WNW	3.30	BDL	BDL
22959	83/10/ 3	SW	12.20	.80	.066
22959	83/10/ 9	NE	3.00	BDL	BDL
22959	83/10/21	NE	7.10	.30	.042
ARITH MEAN			7.22	.85	
STD DEV			3.10	.57	
GEO MEAN			6.88	.35	
MAXIMUM			12.20	1.90	
MINIMUM			2.10	.00	
# OF SAMPLE			19	19	

1983 Carbon Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CT	CF	RATIO (CF/CT)
22961	83/ 1/ 6	SW	7.60	1.80	.237
22961	83/ 1/12	NW	2.20	.50	.227
22961	83/ 2/23	NW	2.40	.40	.167
22961	83/ 3/ 1	NE	11.90	2.10	.176
22961	83/ 3/31	NE	4.70	.60	.128
22961	83/ 4/27	S	13.90	2.10	.151
22961	83/ 4/30	S	3.60	.70	.194
22961	83/ 5/ 6	S	30.90	3.30	.107
22961	83/ 5/30	SW	6.10	.80	.131
22961	83/ 6/ 5	SW	10.40	.60	.058
22961	83/ 6/11	S	10.30	1.40	.136
22961	83/ 6/29	NE	7.70	2.10	.273
22961	83/ 7/11	SW	14.20	2.90	.204
22961	83/ 7/23	SSW	7.00	.80	.114
22961	83/ 8/ 4	SW	9.70	1.10	.113
22961	83/ 8/16	SSW	11.00	1.10	.100
22961	83/ 8/22	NW	8.80	1.10	.125
22961	83/ 9/ 9	SW	15.50	3.30	.213
22961	83/ 9/21	WNW	5.10	1.10	.216
22961	83/10/ 3	SW	13.20	3.10	.235
22961	83/10/ 9	NE	3.00	BDL	BDL
ARITH MEAN			9.49	1.47	
STD DEV			6.20	.99	
GEO MEAN			7.78	.87	
MAXIMUM			30.90	3.30	
MINIMUM			2.20	.00	
# OF SAMPLE			21	21	

BDL - below detection limit

1983 Carbon Data (ug/m3)

STAT'N NUMBER	DATE	WIND DIRECT'N	CT	CF	RATIO (CF/CT)
22963	83/ 1/ 6	SW	8.60	.50	.058
22963	83/ 1/12	NW	2.70	.40	.148
22963	83/ 2/23	NW	2.30	.40	.174
22963	83/ 3/ 1	NE	14.00	2.40	.171
22963	83/ 3/31	NE	4.20	.60	.143
22963	83/ 4/30	S	3.50	1.20	.343
22963	83/ 5/ 6	S	8.90	1.60	.180
22963	83/ 5/30	SW	5.60	1.10	.196
22963	83/ 6/ 5	SW	4.50	1.40	.311
22963	83/ 6/11	S	11.80	1.60	.136
22963	83/ 6/29	NE	6.60	.80	.121
22963	83/ 7/11	SW	7.80	.30	.038
22963	83/ 7/23	SSW	7.80	1.00	.128
22963	83/ 8/ 4	SW	7.80	1.40	.179
22963	83/ 8/16	SSW	12.50	1.20	.096
22963	83/ 8/22	NW	8.60	.40	.047
22963	83/ 9/ 9	SW	12.00	2.50	.208
22963	83/ 9/21	WNW	4.60	1.20	.261
22963	83/10/ 3	SW	13.60	1.20	.088
22963	83/10/ 9	NE	2.30	BDL	BDL
22963	83/10/21	NE	6.00	.50	.083

ARITH MEAN	7.41	1.03
STD DEV	3.62	.64
GEO MEAN	6.45	.64
MAXIMUM	14.00	2.50
MINIMUM	2.30	.00
# OF SAMPLE	21	21

BDL - below detection limit

Appendix 2

NEMP PRECIPITATION DATA COLLECTED DURING JANUARY TO DECEMBER 1983

Data are presented on a 28 day basis according to sampling station. All concentrations are expressed in mg/l except precipitation volume which is expressed in ml. Total acidity is expressed as $CaCO_3$. (N/A) represents missing or unavailable data. The NO_3^- and NH_4^+ concentrations are expressed as N-NO_3^- and N-NH_4^+ respectively.

1988 Precipitation Trace Metal Data (MG/L)

STAT'N NUMBER	REMOVAL DATE	CA	CD	CU	FE	K	MG	MN	NA	NI	PB	P	V	ZN	AL
22902	FEB 1,88	1.0500	BDL	0.0080	0.0970	0.0850	0.3100	0.0090	0.3600	BDL	0.0190	0.0210	BDL	0.0200	0.0570
22902	MAR 1,88	1.1800	0.0002	BDL	0.0970	0.0250	0.3600	0.0160	0.5750	BDL	0.0150	0.0310	BDL	0.0170	0.0900
22902	MAR 29,88	N/A	0.0001	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0470	N/A	N/A	N/A
22902	APR 26,88	0.4200	N/A	BDL	0.0610	0.0400	0.1100	0.0050	0.1000	BDL	0.0070	0.0160	BDL	0.0100	0.0800
22902	MAY 24,88	0.5700	BDL	0.0080	0.0790	0.0650	0.1600	0.0070	0.0550	BDL	0.0040	0.0120	BDL	0.0080	0.0710
22902	JUN 21,88	2.4000	BDL	0.0050	0.3770	0.1550	0.7850	0.0280	0.0700	0.0020	0.0270	0.0540	BDL	0.0260	0.3060
22902	JUL 19,88	1.0400	0.0002	0.0010	0.0890	0.1400	0.3900	0.0080	0.0850	BDL	0.0190	0.0150	BDL	0.0140	0.0710
22902	AUG 16,88	0.4200	0.0001	0.0010	0.0480	0.0400	0.0900	0.0050	0.0250	BDL	0.0070	0.0070	BDL	0.0040	0.0510
22902	SEP 13,88	N/A	BDL	0.0070	0.2570	N/A	N/A	0.0360	N/A	0.0010	0.0250	0.0620	BDL	0.0480	0.1580
22902	OCT 11,88	1.0200	0.0002	0.0020	0.2410	0.0750	0.2500	0.0130	0.0300	BDL	0.0160	0.0210	BDL	0.0130	0.2420
22902	NOV 8,88	0.7200	BDL	BDL	0.1250	0.0700	0.2250	0.0120	0.0750	BDL	0.0080	0.0340	BDL	0.0140	0.1320
22902	DEC 6,88	0.4500	BDL	BDL	0.0240	0.0450	0.1150	0.0040	0.1150	BDL	0.0070	0.0070	BDL	0.0110	0.0310
22902	JAN 3,84	0.6000	BDL	0.0020	0.1580	0.0200	0.1500	0.0100	0.4750	BDL	0.0110	0.0190	BDL	0.0070	0.1590
ARITH MEAN		.8979	N/A	.0030	.1394	.0645	.2628	.0127	.1786	N/A	.0137	.0266	N/A	.0156	.1207
STD DEV		.5460	N/A	.0019	.1019	.0427	.1880	.0094	.1860	N/A	.0073	.0172	N/A	.0100	.0799
GEO MEAN		.7762	N/A	.0024	.1078	.0530	.2146	.0102	.1069	N/A	.0118	.0214	N/A	.0130	.0982
MAXIMUM		2.4000	N/A	.0070	.3770	.1550	.7850	.0860	.5750	N/A	.0270	.0620	N/A	.0430	.3060
MINIMUM		.4200	N/A	.0010	.0240	.0200	.0900	.0040	.0250	N/A	.0040	.0070	N/A	.0040	.0310
# OF SAMPLE		11	12	12	12	12	12	12	12	12	12	12	12	12	12
VOL WT MEAN		.6927	N/A	.0012	.1001	.0501	.1916	.0086	.1274	N/A	.0103	.0171	N/A	.0107	.0958

1988 Precipitation Trace Metal Data (MG/L)

STAT'N NUMBER	REMOVAL DATE	CA	CD	CU	FE	K	MG	MN	NA	NI	PB	P	V	ZN	AL
22953	FEB 1,88	0.4500	0.0001	0.0020	0.0730	0.0250	0.0800	0.0070	0.1350	BDL	0.0120	0.0080	BDL	0.0120	0.0360
22953	MAR 1,88	0.4200	BDL	0.0100	0.0600	0.0200	0.0900	0.0600	0.1250	BDL	0.0130	0.0160	BDL	0.0090	0.0580
22953	MAR 29,88	0.5200	0.0002	0.0020	0.1480	0.0300	0.1000	0.0150	0.0850	BDL	0.0130	0.0060	BDL	0.0070	0.1020
22953	APR 26,88	0.5000	BDL	0.0020	0.0810	0.0450	0.0850	0.0080	0.0800	BDL	0.0060	0.0100	BDL	0.0070	0.1220
22953	MAY 24,88	0.4600	BDL	0.0010	0.0580	0.0450	0.0700	0.0050	0.0550	BDL	0.0040	0.0080	BDL	0.0050	0.0570
22953	JUN 21,88	0.3800	BDL	0.0020	0.0760	0.0700	0.0800	0.0100	0.0550	BDL	0.0120	0.0300	BDL	0.0090	0.0460
22953	JUL 19,88	0.2100	BDL	0.0020	0.0280	0.0800	0.0300	0.0020	0.0250	BDL	0.0060	0.0090	BDL	0.0400	0.0230
22953	AUG 16,88	0.2900	0.0002	0.0020	0.0200	0.0300	0.0450	0.0040	0.0550	BDL	0.0130	0.0090	BDL	0.0070	0.0250
22953	SEP 13,88	0.4000	BDL	0.0020	0.0500	0.0850	0.0750	0.0050	0.0450	BDL	0.0150	0.0140	BDL	0.0060	0.0260
22953	OCT 11,88	0.4000	BDL	BDL	0.0660	0.0550	0.0550	0.0050	0.0300	BDL	0.0060	0.0100	BDL	0.0070	0.0320
22953	NOV 8,88	0.2000	BDL	BDL	0.0100	0.0500	0.0400	0.0030	0.0550	BDL	0.0030	0.0210	BDL	0.0030	0.0120
22953	DEC 6,88	0.2600	BDL	0.0010	0.0470	BDL	0.0400	0.004	0.0850	BDL	0.0040	0.0100	BDL	0.0060	0.0770
22953	JAN 3,84	0.5000	BDL	BDL	0.2180	BDL	0.1250	0.0120	0.1350	BDL	0.0060	0.0080	BDL	0.0080	0.2190
ARITH MEAN		.3838	N/A	.0021	.0712	.0354	.0784	.0109	.0742	N/A	.0087	.0122	N/A	.0097	.0658
STD DEV		.1059	N/A	.0024	.0530	.0191	.0268	.0146	.0361	N/A	.0041	.0064	N/A	.0090	.0538
GEO MEAN		.3648	N/A	.0015	.0546	.0255	.0652	.0071	.0655	N/A	.0076	.0110	N/A	.0078	.0495
MAXIMUM		.5200	N/A	.0100	.2180	.0700	.1250	.0400	.1350	N/A	.0150	.0300	N/A	.0400	.2190
MINIMUM		.2000	N/A	.0005	.0100	.0025	.0300	.0020	.0250	N/A	.0030	.0060	N/A	.0030	.0120
# OF SAMPLE		13	13	13	13	13	13	13	13	13	13	13	13	13	13
VOL WT MEAN		.3893	N/A	.0017	.0729	.0347	.0703	.0099	.0720	N/A	.0074	.0120	N/A	.0093	.0708

N/A - data not available
BDL - below detection limit

1983 Precipitation Trace Metal Data (MG/L)

STAT'N NUMBER	REMOVAL DATE	CA	CD	CU	FE	K	MG	MN	NA	NI	PB	P	V	ZN	AL
22954	FEB 1,83	0.4800	0.0002	0.0020	0.0460	0.0200	0.0950	0.0050	0.1400	BDL	0.0280	0.0100	BDL	0.0110	0.0350
22954	MAR 1,83	0.3700	0.0002	0.0020	0.0530	0.0250	0.0800	0.0030	0.1550	BDL	0.0090	0.0130	BDL	0.0070	0.0580
22954	MAR 29,83	0.4700	BDL	0.0020	0.0500	0.0850	0.0900	0.0040	0.1000	BDL	0.0100	0.0160	BDL	0.0060	0.0460
22954	APR 26,83	0.4600	BDL	0.0010	0.0420	0.0500	0.0850	0.0050	0.0850	BDL	0.0070	0.0200	BDL	0.0060	0.0740
22954	MAY 24,83	0.3500	0.0001	0.0020	0.0400	0.0550	0.0800	0.0040	0.0500	BDL	0.0040	0.0090	BDL	0.0050	0.0490
22954	JUN 21,83	0.4100	BDL	0.0040	0.0670	0.0400	0.0800	0.0070	0.0350	BDL	0.0100	0.0120	BDL	0.0060	0.0550
22954	JUL 19,83	0.3400	0.0001	0.0010	0.0510	0.0750	0.0600	0.0040	0.0500	0.0010	0.0090	0.0140	BDL	0.0050	0.0420
22954	AUG 16,83	0.3000	0.0005	0.0080	0.0430	0.0550	0.0500	0.0040	0.0350	0.0010	0.0130	0.0100	BDL	0.0070	0.0560
22954	SEP 13,83	0.4800	BDL	0.0020	0.0450	0.0400	0.1150	0.0050	0.0400	BDL	0.0140	0.0130	BDL	0.0060	0.0900
22954	OCT 11,83	0.5200	BDL	0.0010	0.0900	0.0750	0.1000	0.0070	0.0150	BDL	0.0120	0.0110	BDL	0.0110	0.0850
22954	NOV 8,83	1.1400	BDL	BDL	0.0500	0.4700	0.2450	0.0050	0.0450	0.0010	0.0060	0.0490	BDL	0.0060	0.0420
22954	DEC 6,83	0.2500	BDL	BDL	0.0370	0.0200	0.0450	0.0030	0.0800	BDL	0.0060	0.0110	BDL	0.0060	0.0500
22954	JAN 3,84	0.2300	BDL	0.0040	0.0970	BDL	0.0650	0.0050	0.1300	BDL	0.0040	0.0310	BDL	0.0060	0.1120
ARITH MEAN		.4429	N/A	.0019	.0578	.0740	.0915	.0047	.0754	N/A	.0102	.0168	N/A	.0068	.0565
STD DEV		.2189	N/A	.0011	.0174	.1161	.0482	.0012	.0428	N/A	.0060	.0108	N/A	.0019	.0215
GEO MEAN		.4064	N/A	.0016	.0555	.0394	.0832	.0045	.0627	N/A	.0088	.0147	N/A	.0066	.0530
MAXIMUM		1.1400	N/A	.0040	.0970	.4700	.2450	.0070	.1550	N/A	.0280	.0490	N/A	.0110	.1120
MINIMUM		.2300	N/A	.0005	.0370	.0025	.0450	.0030	.0150	N/A	.0040	.0090	N/A	.0050	.0300
# OF SAMPLE		13	13	13	13	13	13	13	13	13	13	13	13	13	13
VOL WT MEAN		.4569	N/A	.0014	.0531	.0849	.0939	.0045	.0712	N/A	.0088	.0168	N/A	.0064	.0532

1983 Precipitation Trace Metal Data (MG/L)

STAT'N NUMBER	REMOVAL DATE	CA	CD	CU	FE	K	MG	MN	NA	NI	PB	P	V	ZN	AL
22956	FEB 1,83	0.8700	0.0001	0.0020	0.0650	0.0350	0.2950	0.0060	0.2650	BDL	0.0170	0.0140	BDL	0.0130	0.0540
22956	MAR 1,83	0.4200	BDL	0.0020	0.0390	0.0150	0.1300	BDL	0.2200	BDL	0.0120	0.0170	BDL	0.0060	0.0420
22956	MAR 29,83	0.4500	BDL	BDL	0.0480	0.1000	0.1200	0.0040	0.1600	BDL	0.0080	0.0410	BDL	0.0050	0.0730
22956	APR 29,83	0.4500	BDL	BDL	0.0580	0.0550	0.1050	0.0040	0.1000	BDL	0.0050	0.0150	BDL	0.0050	0.0810
22956	MAY 24,83	0.4800	BDL	0.0010	0.0580	0.0550	0.0950	0.0050	0.0700	BDL	0.0030	0.0100	BDL	0.0040	0.0620
22956	JUN 21,83	0.2900	0.0001	BDL	0.0540	0.0850	0.0700	0.0050	0.0450	BDL	0.0080	0.0210	BDL	0.0090	0.0370
22956	JUL 19,83	0.3500	0.0002	N/A	0.0940	0.0400	0.0900	0.0040	0.0250	BDL	0.0540	0.0070	BDL	0.0520	1.0230
22956	AUG 16,83	0.3600	BDL	0.0020	0.0470	0.0800	0.0700	0.0040	0.0350	BDL	0.0070	0.0070	BDL	0.0050	0.0460
22956	SEP 13,83	0.3000	BDL	0.0020	0.0270	0.0400	0.1000	0.0030	0.0400	0.0010	0.0160	0.0180	BDL	0.0050	0.0250
22956	OCT 11,83	0.3200	BDL	BDL	0.0940	0.0300	0.0700	0.0040	0.0200	BDL	0.0080	0.0080	BDL	0.0060	0.0750
22956	NOV 8,83	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.1200	N/A	N/A	N/A
22956	DEC 6,83	0.2500	BDL	BDL	0.0230	0.0100	0.0450	0.0020	0.1400	BDL	0.0060	0.0180	BDL	0.0070	0.0300
22956	JAN 3,84	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ARITH MEAN		.4082	N/A	.0018	.1224	.0450	.1100	.0038	.0964	N/A	.0131	.0247	N/A	.0106	.1407
STD DEV		.1600	N/A	.0004	.2264	.0242	.0620	.0014	.0702	N/A	.0136	.0301	N/A	.0183	.2796
GEO MEAN		.3854	N/A	.0017	.0614	.0373	.0993	.0033	.0708	N/A	.0095	.0167	N/A	.0074	.0646
MAXIMUM		.8700	N/A	.0020	.8360	.1000	.2950	.0060	.2200	N/A	.0540	.1200	N/A	.0520	1.0230
MINIMUM		.2500	N/A	.0010	.0230	.0100	.0650	.0005	.0200	N/A	.0030	.0070	N/A	.0040	.0250
# OF SAMPLE		11	11	11	11	11	11	11	11	11	11	11	11	11	11
VOL WT MEAN		.3900	N/A	.0009	.0521	.0459	.0966	.0038	.0883	N/A	.0077	.0268	N/A	.0059	.0555

N/A - data not available
BDL - below detection limit

1983 Precipitation Trace Metal Data (MG/L)

STAT'N NUMBER	REMOVAL DATE	CA	CD	CU	FE	K	MG	MN	NA	NI	PB	P	V	ZN	AL
22958	FEB 1,83	0.5300	0.0002	0.0020	0.0520	0.0400	0.1600	0.0050	0.1600	BDL	0.0140	0.0160	BDL	0.0140	0.0410
22958	MAR 1,83	0.2500	0.0001	0.0020	0.0570	0.0200	0.0800	0.0030	0.1350	BDL	0.0110	0.0120	BDL	0.0110	0.0620
22958	MAR 29,83	0.2700	0.0001	BDL	0.0460	0.0250	0.0550	0.0030	0.0650	BDL	0.0340	0.0270	BDL	0.0280	0.0480
22958	APR 26,83	0.3500	BDL	0.0020	0.0640	0.0600	0.0750	0.0040	0.0950	BDL	0.0060	0.0170	BDL	0.0090	0.0720
22958	MAY 24,83	0.4600	BDL	0.0010	0.0420	0.0650	0.1000	0.0040	0.0850	BDL	BDL	0.0110	BDL	0.0040	0.0580
22958	JUN 21,83	0.4700	0.0001	0.0020	0.0780	0.0050	0.1200	0.0050	0.0050	BDL	0.0120	0.0100	BDL	0.0080	0.0500
22958	JUL 19,83	0.7900	BDL	0.0250	0.8770	0.6850	0.2450	0.0080	0.0300	BDL	0.1030	0.0740	BDL	0.0570	0.6670
22958	AUG 16,83	0.4200	BDL	0.0010	0.0480	0.0400	0.1000	0.0040	0.0300	BDL	0.0060	0.0140	BDL	0.0050	0.0400
22958	SEP 13,83	2.2000	0.0001	0.0040	0.1600	0.4400	0.7200	0.0160	0.0950	BDL	0.0080	0.1280	BDL	0.0210	0.0920
22958	OCT 11,83	0.5200	BDL	BDL	0.0940	0.0500	0.1300	0.0060	0.0250	BDL	0.0100	0.0100	BDL	0.0070	0.0920
22958	NOV 8,83	0.2000	BDL	BDL	0.0190	0.0300	0.0600	0.0020	0.0450	BDL	0.0040	0.0140	BDL	0.0060	0.0140
22958	DEC 6,83	0.3400	0.0001	BDL	0.0230	0.2700	0.0850	0.0030	0.0950	BDL	0.0020	0.0570	BDL	0.0100	0.0260
22958	JAN 3,84	0.6100	BDL	BDL	0.1260	0.0850	0.2100	0.0050	0.2950	0.0010	0.0140	0.0190	BDL	0.0080	0.1270
ARITH MEAN		.5700	N/A	.0049	.1298	.1358	.1646	.0052	.0892	N/A	.0173	.0315	N/A	.0145	.1068
STD DEV		.4951	N/A	.0077	.2192	.1986	.1694	.0034	.0736	N/A	.0260	.0337	N/A	.0139	.1643
GEO MEAN		.4611	N/A	.0025	.0696	.0570	.1235	.0045	.0607	N/A	.0084	.0214	N/A	.0107	.0634
MAXIMUM		2.2000	N/A	.0250	.8770	.6850	.7200	.0160	.2950	N/A	.1030	.1280	N/A	.0570	.6670
MINIMUM		.2000	N/A	.0010	.0190	.0050	.0550	.0020	.0050	N/A	.0005	.0100	N/A	.0040	.0140
# OF SAMPLE		13	13	13	13	13	13	13	13	13	13	13	13	13	13
VOL WT MEAN		.4093	N/A	.0008	.0525	.0774	.1058	.0040	.0780	N/A	.0090	.0224	N/A	.0097	.0526

1988 Precipitation Trace Metal Data (MG/L)

STAT'N NUMBER	REMOVAL DATE	CA	CD	CU	FE	K	MG	MN	NA	NI	PB	P	V	ZN	AL
22960	FEB 1,83	0.8500	0.0001	0.0020	0.0520	0.0800	0.1850	0.0040	0.1600	BDL	0.0140	0.0040	BDL	0.0120	0.0340
22960	MAR 1,83	0.3300	BDL	BDL	0.0380	0.0150	0.0650	0.0030	0.1550	BDL	0.0080	0.0120	BDL	0.0070	0.0470
22960	MAR 29,83	0.4700	BDL	BDL	0.0520	0.0250	0.0800	0.0040	0.0850	BDL	0.0100	0.0060	BDL	0.0060	0.0460
22960	APR 26,83	0.6600	BDL	BDL	0.0530	0.0600	0.1800	0.0040	0.1000	BDL	0.0070	0.0370	BDL	0.0070	0.0700
22960	MAY 24,83	0.4400	BDL	0.0010	0.0600	0.0750	0.0900	0.0040	0.1050	BDL	0.0030	0.0100	BDL	0.0050	0.0540
22960	JUN 21,83	0.4800	BDL	BDL	0.0830	0.0950	0.1250	0.0060	0.0450	BDL	0.0080	0.0160	BDL	0.0110	0.0460
22960	JUL 19,83	0.4700	BDL	0.0220	0.9050	0.1100	0.1200	0.0040	0.0250	BDL	0.0900	0.0150	0.0020	0.0470	0.6910
22960	AUG 16,83	0.5600	BDL	0.0030	0.0540	0.1450	0.1000	0.0070	0.0550	BDL	0.0060	0.1170	BDL	0.0070	0.0500
22960	SEP 13,83	N/A	BDL	0.0030	0.2840	N/A	N/A	0.0130	N/A	BDL	0.0220	N/A	BDL	0.0140	0.1770
22960	OCT 11,83	0.4600	BDL	BDL	0.1150	0.0350	0.0700	0.0060	0.0150	BDL	0.0060	0.0040	BDL	0.0080	0.0890
22960	NOV 8,83	0.2600	BDL	BDL	0.0200	0.0250	0.0600	0.0020	0.0500	BDL	0.0040	0.0170	BDL	0.0160	0.0200
22960	DEC 6,83	0.3100	BDL	0.0010	0.0220	0.0200	0.0700	0.0020	0.0450	BDL	0.0050	0.0050	BDL	0.0050	0.0300
22960	JAN 3,84	0.1500	0.0001	BDL	0.0510	BDL	0.0500	0.0020	0.0550	BDL	0.0040	0.0080	BDL	0.0050	0.0580
ARITH MEAN		.4533	N/A	.0058	.1338	.0531	.0996	.0047	.0746	N/A	.0144	.0209	N/A	.0115	.1086
STD DEV		.1775	N/A	.0075	.2289	.0428	.0491	.0028	.0453	N/A	.0224	.0302	N/A	.0108	.1723
GEO MEAN		.4160	N/A	.0027	.0690	.0350	.0915	.0041	.0608	N/A	.0084	.0119	N/A	.0091	.0629
MAXIMUM		.8500	N/A	.0220	.9050	.1450	.1850	.0130	.1600	N/A	.0900	.1170	N/A	.0470	.6910
MINIMUM		.1500	N/A	.0010	.0200	.0025	.0500	.0020	.0150	N/A	.0030	.0040	N/A	.0050	.0200
# OF SAMPLE		12	13	13	13	12	12	13	12	13	13	12	13	13	13
VOL WT MEAN		.4430	N/A	.0011	.0621	.0488	.0919	.0047	.0695	N/A	.0067	.0366	N/A	.0078	.0563

N/A - data not available
BDL - below detection limit

1983 Precipitation Ions Data (MG/L)

STAT'N NUMBER	REMOVAL DATE	CL	NH3	NO3	N	SO4	ACID	PH	VOL
22902	FEB 1,83	0.6400	0.7700	0.9400	0.9400	5.0500	5.040	4.120	476
22902	MAR 1,83	0.8500	0.5500	0.9500	0.6400	4.5000	4.800	4.380	751
22902	MAR 29,83	1.7600	0.3800	0.7800	0.7500	4.8500	N/A	N/A	117
22902	APR 26,83	0.2500	0.2920	0.5600	0.4800	3.6000	4.530	4.240	1409
22902	MAY 24,83	0.1800	0.5800	0.3800	0.6300	4.5500	3.670	4.380	1640
22902	JUN 21,83	0.4100	1.4700	1.5500	1.5000	15.8000	9.830	3.860	449
22902	JUL 19,83	0.2100	1.4200	0.8800	1.5400	9.3000	6.480	4.060	1272
22902	AUG 16,83	0.1300	0.4500	0.5400	0.4800	5.4000	5.700	4.200	3650
22902	SEP 13,83	N/A	N/A	N/A	3.1000	N/A	3.270	4.770	164
22902	OCT 11,83	0.2400	0.5500	0.8400	0.6700	7.1000	6.100	4.050	1308
22902	NOV 8,83	0.2300	0.4200	0.4700	0.5200	4.1500	2.730	4.500	1479
22902	DEC 6,83	0.2900	0.3900	0.5200	0.4300	3.3000	3.400	4.400	2169
22902	JAN 3,83	0.7300	0.0400	0.3500	0.1700	1.8500	2.270	4.720	1140
ARITH MEAN		.4933	.6093	.7300	.9115	5.7875	4.818	4.233	
STD DEV		.4435	.4101	.3222	.7378	3.5146	1.979	N/A	
GEO MEAN		.3652	.4611	.6676	.7114	5.0225	4.457	4.307	
MAXIMUM		1.7600	1.4700	1.5500	3.1000	15.8000	9.830	4.770	
MINIMUM		.1300	.0400	.3500	.1700	1.8500	2.270	3.860	
# OF SAMPLE		12	12	12	13	12	12	12	
VOL WT MEAN		.3050	.5377	.6161	.6484	5.1835	4.676	4.250	

1983 Precipitation Ions Data (MG/L)

STAT'N NUMBER	DATE	CL	NH3	NO3	N	SO4	ACID	PH	VOL
22953	FEB 1,83	0.3500	0.3560	0.7800	0.5100	3.5000	6.080	4.020	744
22953	MAR 1,83	0.2700	0.2240	0.5800	0.3400	2.7500	7.770	4.270	1046
22953	MAR 29,83	0.1800	0.2300	0.3800	0.2700	2.9000	3.910	4.340	1898
22953	APR 26,83	0.2500	0.2220	0.6200	0.3400	4.0500	5.410	4.140	1959
22953	MAY 24,83	0.1700	0.3700	0.3800	0.4500	4.0000	4.340	4.240	2554
22953	JUN 21,83	0.1300	0.6900	0.6600	1.0300	5.9000	6.390	4.040	1105
22953	JUL 19,83	0.0600	0.3500	0.3000	0.4400	3.8000	4.400	4.240	1456
22953	AUG 16,83	0.1700	0.4200	0.5100	0.4700	5.0500	5.930	4.140	-
22953	SEP 13,83	0.1400	0.6400	0.6200	0.6900	5.8000	5.480	4.220	893
22953	OCT 11,83	0.0800	0.4300	0.5600	0.5100	3.7500	3.810	4.380	1320
22953	NOV 8,83	0.1500	0.1500	0.3400	0.2000	2.3000	3.130	4.370	2000
22953	DEC 6,83	0.5400	0.1640	0.4500	0.2300	2.5500	9.860	4.270	1805
22953	JAN 3,83	0.2200	0.0400	0.4200	0.1600	1.7500	2.760	4.590	1239
ARITH MEAN		.2085	.3297	.5038	.4338	3.7000	5.325	4.227	
STD DEV		.1216	.1805	.1302	.2296	1.2393	1.884	N/A	
GEO MEAN		.1788	.2704	.4864	.3840	3.4908	5.017	4.251	
MAXIMUM		.5400	.6900	.7300	1.0300	5.9000	9.860	4.590	
MINIMUM		.0600	.0400	.3000	.1600	1.7500	2.760	4.020	
# OF SAMPLE		13	13	13	13	13	13	13	
VOL WT MEAN		.2118	.2981	.4733	.3965	3.4790	5.138	4.251	

N/A - data not available

1983 Precipitation Ions Data (MG/L)

STAT'N NUMBER	DATE	CL	NH3	NO3	N	SO4	ACID	PH	VOL
22954	FEB 1,83	0.3800	0.5600	0.7900	0.6800	3.8500	5.620	4.030	762
22954	MAR 1,83	0.4400	0.3620	0.7600	0.5300	4.0000	9.060	4.120	1168
22954	MAR 29,83	0.2000	0.2940	0.3800	0.4000	3.0000	3.600	4.340	1599
22954	APR 26,83	0.2100	0.2800	0.5600	0.4500	3.8000	4.870	4.220	1713
22954	MAY 24,83	0.1700	0.4900	0.3900	0.5500	4.2000	4.370	4.270	2591
22954	JUN 21,83	0.1300	0.6100	0.6600	0.7200	5.9000	6.460	4.070	874
22954	JUL 19,83	0.0700	0.6600	0.3800	0.7200	4.5500	4.260	4.240	2428
22954	AUG 16,83	0.1700	0.4100	0.5000	0.5000	4.3500	5.070	4.260	N/A
22954	SEP 13,83	0.1300	0.6700	0.5100	0.7400	4.6500	3.060	4.390	1348
22954	OCT 11,83	0.1100	0.5000	0.6600	0.6200	4.9000	4.830	4.170	1482
22954	NOV 8,83	0.3200	0.0680	0.2400	0.3000	3.6000	1.630	4.930	1775
22954	DEC 6,83	0.2900	0.2700	0.4800	0.3400	2.7500	3.740	4.330	2491
22954	JAN 3,84	0.3800	0.0100	0.2400	0.1900	1.9000	3.340	4.440	545
	ARITH MEAN	.2308	.3988	.5038	.5185	3.9577	4.608	4.251	
	STD DEV	.1141	.2028	.1716	.1697	.9798	1.741	N/A	
	GEO MEAN	.2020	.2853	.4723	.4850	3.8202	4.284	4.293	
	MAXIMUM	.4400	.6700	.7900	.7400	5.9000	9.060	4.930	
	MINIMUM	.0700	.0100	.2400	.1900	1.9000	1.630	4.030	
	# OF SAMPLE	13	13	13	13	13	13	13	
	VOL WT MEAN	.2153	.4073	.4785	.5193	3.9308	4.345	4.273	

1983 Precipitation Ions Data (MG/L)

STAT'N NUMBER	DATE	CL	NH3	NO3	N	SO4	ACID	PH	VOL
22956	FEB 1,83	0.7600	0.5000	1.0100	0.6600	4.4500	6.140	4.050	693
22956	MAR 1,83	0.4000	0.2660	0.6200	0.3700	3.2500	5.170	4.150	873
22956	MAR 29,83	0.2600	0.5600	0.3400	1.0400	2.4000	1.330	6.830	1906
22956	APR 26,83	0.2500	0.2440	0.5700	0.3800	4.2500	5.340	4.170	1602
22956	MAY 24,83	0.1900	0.4200	0.4300	0.6100	4.6500	5.050	4.150	2285
22956	JUN 21,83	0.1500	0.7700	0.7200	0.9800	6.5500	6.970	4.050	1182
22956	JUL 19,83	0.1100	0.5200	0.4700	0.6200	5.6000	5.740	4.030	21
22956	AUG 16,83	0.1800	0.5000	0.6900	0.5700	6.3000	7.620	4.020	3586
22956	SEP 13,83	0.1500	0.5900	0.4500	0.6800	4.6000	4.260	4.250	911
22956	OCT 11,83	0.1700	0.2740	0.4900	0.2900	3.9500	4.460	4.330	1613
22956	NOV 8,83	N/A	0.2920	N/A	1.1000	N/A	3.170	4.410	1927
22956	DEC 6,83	0.3200	0.2480	0.5000	0.3900	2.6500	3.700	4.430	1712
22956	JAN 3,83	N/A	N/A	N/A	N/A	N/A	N/A	5.930	19
	ARITH MEAN	.2673	.4320	.5718	.6408	4.4227	4.912	4.233	
	STD DEV	.1755	.1618	.1761	.2615	1.2927	1.633	N/A	
	GEO MEAN	.2290	.4021	.5482	.5885	4.2237	4.543	4.477	
	MAXIMUM	.7600	.7700	1.0100	1.1000	6.5500	7.620	6.830	
	MINIMUM	.1100	.2440	.3400	.2900	2.4000	1.330	4.020	
	# OF SAMPLE	11	12	11	12	11	12	13	
	VOL WT MEAN	.2495	.4193	.5601	.6474	4.4848	4.948	4.218	

N/A - data not available

1983 Precipitation Ions Data (MG/L)

STAT'N NUMBER	DATE	CL	NH3	NO3	N	SO4	ACID	PH	VOL
22958	FEB 1,83	0.5200	1.2400	1.1600	1.4200	4.9500	6.240	4.060	607
22958	MAR 1,83	0.3000	0.6600	0.6700	0.7200	3.5000	4.260	4.270	1060
22958	MAR 29,83	0.1700	0.5400	0.3700	0.8000	2.4500	2.910	4.490	2223
22958	APR 26,83	0.2700	0.6800	0.5800	0.8200	4.4000	4.520	4.280	1782
22958	MAY 24,83	0.2000	0.8100	0.4600	0.9500	5.0000	3.830	4.320	2564
22958	JUN 21,83	0.1700	1.1300	0.8600	1.2200	7.2000	6.880	4.030	491
22958	JUL 19,83	0.2300	1.3000	0.5600	1.9500	6.8500	2.560	4.670	21
22958	AUG 16,83	0.1600	0.8400	0.5700	0.8200	5.5500	4.960	4.260	3882
22958	SEP 13,83	0.4400	1.4300	1.1400	3.2500	9.9900	1.160	7.640	318
22958	OCT 11,83	0.1300	0.8000	0.5900	0.8500	5.1500	3.590	4.420	1747
22958	NOV 8,83	0.1400	0.5900	0.3500	0.6800	2.9000	2.500	4.520	2234
22958	DEC 6,83	0.4000	0.0180	0.5900	1.8500	4.1000	2.890	4.540	2619
22958	JAN 3,84	0.6100	0.5700	0.4600	0.5800	2.4000	1.80	5.190	950
	ARITH MEAN	.2877	.8160	.6431	1.2238	4.9569	3.700	4.376	
	STD DEV	.1509	.3677	.2498	.7205	2.0486	1.599	N/A	
	GEO MEAN	.2531	.6219	.6014	1.0732	4.5663	3.336	4.668	
	MAXIMUM	.6100	1.4300	1.1600	3.2500	9.9900	6.880	7.640	
	MINIMUM	.1300	.0180	.3500	.5800	2.4000	1.160	4.030	
	# OF SAMPLE	13	13	13	13	13	13	13	
	VOL WT MEAN	.2452	.6593	.5481	1.0023	4.3685	3.739	4.372	

1983 Precipitation Ions Data (MG/L)

STAT'N NUMBER	DATE	CL	NH3	NO3	N	SO4	ACID	PH	VOL
22960	FEB 1,83	0.4400	0.6200	0.8200	0.8000	4.7500	5.400	4.090	583
22960	MAR 1,83	0.3400	0.4200	0.8100	0.4900	4.4000	8.260	4.020	1111
22960	MAR 29,83	0.2100	0.2980	0.3800	0.3600	2.9500	3.920	4.330	1480
22960	APR 26,83	0.2800	0.3180	0.5600	0.7100	4.0000	4.730	4.230	1677
22960	MAY 24,83	0.1700	0.4700	0.4100	0.5500	4.4500	4.330	4.250	2595
22960	JUN 21,83	0.1600	0.8300	0.7100	0.9500	6.3000	5.930	4.150	965
22960	JUL 19,83	0.1000	0.7400	0.4700	0.9000	5.8000	4.710	4.150	24
22960	AUG 16,83	0.1500	0.7700	0.5300	1.2300	4.8500	3.750	4.450	4971
22960	SEP 13,83	N/A	1.2900	N/A	N/A	N/A	N/A	N/A	951
22960	OCT 11,83	N/A	0.4400	0.6200	0.4400	4.7000	4.720	4.280	1806
22960	NOV 8,83	0.1800	0.2080	0.3000	0.2600	2.4500	3.110	4.370	1833
22960	DEC 6,83	0.2400	0.3460	0.2400	0.4000	2.8000	3.500	4.380	2346
22960	JAN 3,84	0.2100	0.1100	0.3100	0.1700	1.6000	2.980	4.470	1738
	ARITH MEAN	.2255	.5277	.5133	.6050	4.0875	4.612	4.243	
	STD DEV	.0923	.3056	.1885	.3027	1.3317	1.389	N/A	
	GEO MEAN	.2086	.4421	.4779	.5262	3.8322	4.432	4.264	
	MAXIMUM	.4400	1.2900	.8200	1.2300	6.3000	8.260	4.470	
	MINIMUM	.1000	.1100	.2400	.1700	1.6000	2.980	4.020	
	# OF SAMPLE	11	13	12	12	12	12	12	
	VOL WT MEAN	.2078	.5015	.4755	.6493	3.9252	4.231	4.306	

N/A - data not available

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